

FLIGHT

&
The AIRCRAFT
ENGINEER.

First Aero Weekly in the World.

Founder and Editor: STANLEY SPOONER.

A Journal devoted to the Interests, Practice, and Progress of Aerial Locomotion and Transport.
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Index and Title Page for Vol. IX.

The 8-page Index for Vol. IX of "FLIGHT" (January to December, 1917) is now ready, and can be obtained from the Publishers, 36, Great Queen Street, Kingsway, W.C. 1. Price 8d. per copy, post free.

EDITORIAL COMMENT.

"Newspapers are an essential part of our war organisation."—
(Sir Auckland Geddes, Minister of National Service.)



LAST week will mark an epoch in the annals of the air, for the reason that for the first time in history the House of Commons debated a separate Estimate for the newly created Air Force, which thus assumes equality with the Navy and Army. From the purely sentimental point of view it is to be regretted that very little could, necessarily, be divulged as to the amount of money to be voted, or as to the strength of the new Third Service and its prospects of future development. Still, at the same time, the debate was of the greatest interest and much information was given to the House, all tending in the direction of proving that the new move is being demonstrated, almost day by day, to have been a wise and statesmanlike one. Major Baird in par-

The
Air Force
Estimates.

ticular is to be congratulated on having presented the case for the Air Force exceedingly well and convincingly. That he was able to fully satisfy the House was easily shown by the almost total absence of criticism, either of the Air Council or of the methods which are current in affecting the transfer of the R.N.A.S. and the R.F.C. to the control of the Hotel Cecil. He was able to tell the House that the Ministry is working in the greatest harmony with the Admiralty and the Army Council. As he pointed out, the process of transfer is—and must be—a gradual one, but it is proceeding smoothly and, so far, there has been no vestige of dislocation in any part of the front. We have never taken the view that there was likely to be any such dislocation, so that it is the more satisfactory to learn that matters are in fact proceeding so well.

Major Baird, having given this assurance, then proceeded to give the House an outline of the organisation of the Air Ministry, showing the number of separate departments that have to be brought into working order, and the duties assigned to each. He further gave some illuminating figures relating to the work of certain of these departments. For instance, he quoted the work of the Inventions Committee as a case in point. This Committee had, he said, in the last month examined no fewer than 1,100 inventions. Doubtless, the greater number of these were of no practical value at all, but it is as interesting as it is reassuring to know that the fountain of invention has not dried up and that the inventor who submits the work of his brain to the Air Ministry is assured of a hearing and of the investigation of his claims.

The
Air Force
in the
Field.

Major Baird seems to have been in his happiest mood when speaking of the work of our airmen at the front. Not many months ago the Prime Minister spoke of aircraft as "the light cavalry of the air"—not, to our way of thinking, a particularly apposite term, nor one likely to make a telling appeal to the minds of the people. Major Baird, however, coined a phrase which will live, because of its moving appeal to the imagination when he spoke of the "boy in the aeroplane." In the course of an eloquent tribute to the work of the airmen he said:—

"The airmen were the eyes of the infantry, the gunners, and the staff. The accuracy and destructiveness of our artillery fire did not depend solely upon brave and skilful

gunners, on guns, and on a plentiful supply of ammunition. Heavy guns fired on an object 15 miles away with a precision which would be quite impossible but for the boy in an aeroplane miles away from the guns, who remained at his post high up in the clouds, constantly exposed to the attacks of hostile aircraft and a continuous anti-aircraft gunfire, until he had directed the fire of the battery on to the target to demolish it. Work of that kind was not and could not be reported in the official *communiqués*, but it was work which was being done daily and hourly by all these boys at the front. The airmen were not only the eyes of the gunners; they were very much more. When one spoke of batteries being engaged to destruction what was meant was that a battery was ranged on to a target and continued to fire at that target until the boy in the aeroplane signalled that it was no longer operative. These boys were the life savers of the gunners and of the infantry too. Every one of the enemy batteries silenced meant the cessation of the bombardment of that particular centre of our trenches which it was told off to destroy, and that meant so many hundreds less of high explosive and gas shells bursting among our lines."

Proceeding, he gave some impressive figures relating to the work of our aerial squadrons at the front. In September last 15,837 photographs were taken from the air. In the same month our airmen dropped 7,886 bombs, and in October 5,113, of a total weight of 238 tons, on the enemy's works, ammunition dumps and communications. Also in September, and in France alone, 139 enemy aeroplanes were destroyed by our airmen, 13 were destroyed by fire from the ground, and 122 were shot down out of control. In December 123,000 rounds were fired by airmen at enemy infantry and in January 209,000 rounds. It is figures like these, incomplete and all as they are, that serve to give the people who stay at home some small—very small—idea of the duties that fall to be carried out by our gallant airmen at the front.

But there was more to follow. In a single day, said Major Baird, thanks to the spotting by our aeroplanes, 127 hostile batteries were "very successfully engaged to destruction," 28 gun-pits were destroyed, 80 damaged, and 60 explosions of ammunition caused. On the same day 34 batteries were silenced owing to balloon observation. Passing to the work of the R.N.A.S. he said that if he did not go so deeply into detail here it was because secrecy was even more an essential element of this branch of air-fighting than any other. The mystery of the sea enveloped in an equal measure those who fought on it, under it, and over it. The House would rest assured that the enemy had the best reason to regret the growing activities of our Naval airmen, who were entitled to the warmest gratitude. Without disclosing any secret it might be asserted with confidence that there was nothing which the German submarine commander was more anxious to shun than the British seaplane manned by the R.N.A.S. The Commanders-in-Chief on the Western Front and in other theatres of the war had borne eloquent testimony in their official despatches to the splendid services rendered to them by R.N.A.S. squadrons.

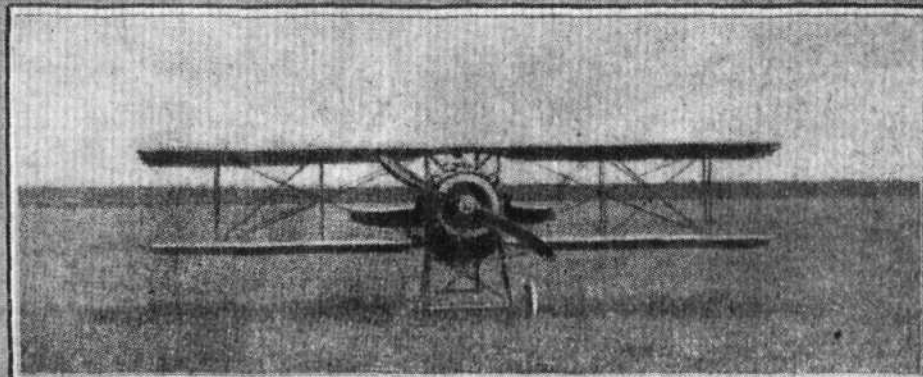
Again, he said, no account of the Flying Services would be complete that omitted a well-deserved tribute to the pilots employed as instructors. These young officers spent hour after hour, day after day, in the air imparting their skill to a constant stream of novices, at whose hands they frequently ran the greatest possible risks. As it was put to him with bluntness, but with considerable truth, by an officer of great experience, "They spend many hours every fine day in the air with a young man who is doing his best, quite unintentionally, but with disconcerting determination, to break both their necks." Every one of those instructors would prefer to be on active

service with a chance of showing his skill against the enemy, and they were entitled to a tribute of admiration for the way in which they sacrificed their chances of obtaining rewards for service in the field.

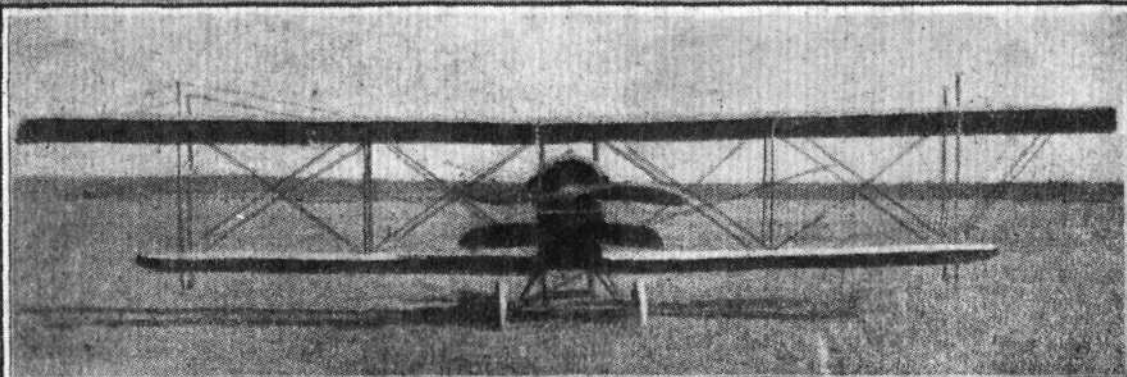
* * *

The Question of Reprisals. Except for a few more or less inane interjections from irresponsible members, the few criticisms of Major Baird's speech were exceedingly moderate, and more on the constructive than the critical side. Mr. King, however, could not resist the temptation of moving an amendment to the effect that "Air attacks against the enemy should be carried out with military objectives, and in such a manner as to avoid, as far as possible, injury to non-combatants, women and children." Major Baird, in reply, said that British air raids *had* military objectives. No British person would intentionally kill women and children. The towns in the Rhine Valley in which munitions were manufactured were of military importance. We had started bombing German towns, and intended to continue doing so, just as the Germans had bombed our towns. That was, unfortunately, one of the new phases of warfare invented by the Germans and practised by them. In the end, the amendment was negatived—as might have been expected.

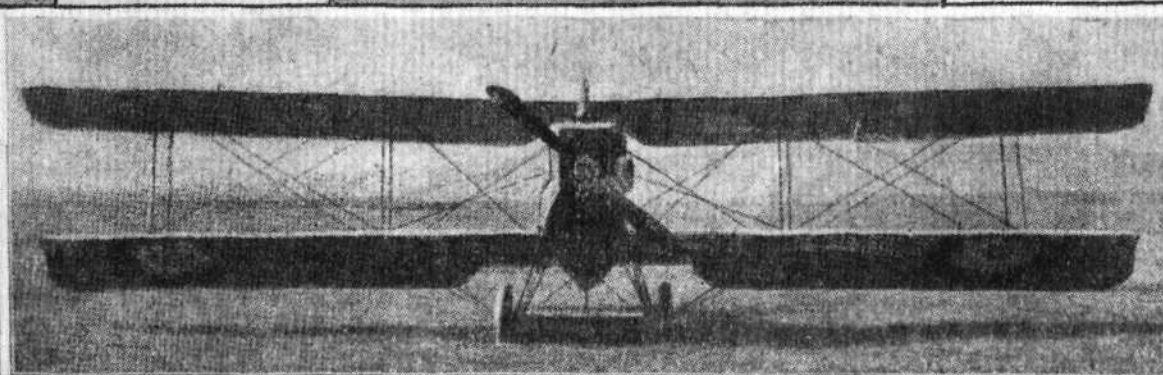
We confess we are at a loss to understand the tenderness with which the Hun seems to be regarded by the white-livered and the pacifist. We ourselves are as averse to the killing of women and children as even Mr. King and his friends. Nor would we agree to reprisals merely by way of revenge. But it surely ought to have dawned on these people by this time that what are called reprisals are the only effective deterrent measures that can be adopted. So long as the Hun is left a monopoly of "frightfulness," so long may we be sure he will pursue his evil ways, with diabolic joy in their effect; but when he ceases to have that monopoly and the balance falls against him, then he squeals for mercy. Poison gas is a case in point. It will possibly be within the recollection of our readers that early in 1915 the Germans protested to the world against our use of gas—at a time when we had not only not used gas, but actually had none to use. This was, of course, simply a preliminary to the use by the Hun of poison gas as a "reprisal." In April, 1915, the Germans made their first use of gas near Ypres, and but for the self-sacrificing heroism of the Canadians, a great disaster to the Allies might easily have eventuated. At once we set our chemists and our chemical factories to work on the manufacture of gas, and before long our preventive measures were such that that gas attack lost most of its terrors. A little later we were able to give the Hun as good as he sent. Now not only are preventive measures much better than those of the enemy, but our means of attack are also far better than his. What has been the result? Some weeks ago a collective Note was sent by the Geneva Red Cross Society to the belligerents protesting against the further use of gas, and proposing that both groups should enter into a covenant to use it no more. Now, in spite of official want of knowledge, there is practically conclusive evidence that the sending of this Note was prompted by the Germans! In other words, the Hun has been hoist with his own petard. He does not like it, and is squealing against the immorality of a practice introduced by himself. It is highly



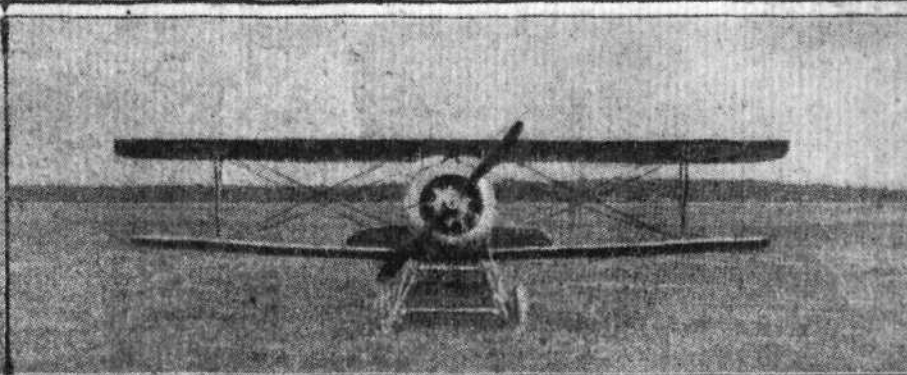
SPAD



CURTIS (TRAINING)



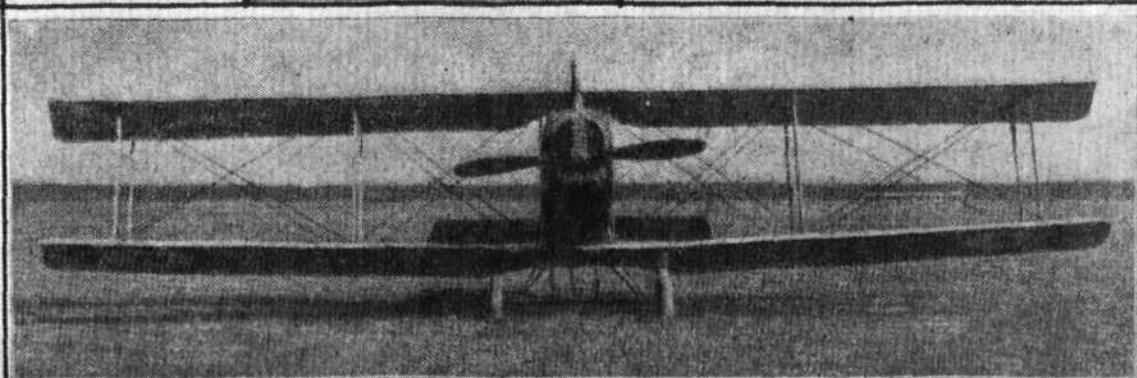
BREGUET A.V.



NIEUPORT



SOPWITH



A.R. (DORAND)

Some aeroplanes of the Fifth Army of France.

"La Guerre Aérienne."

unlikely that, knowing the German regard for "scraps of paper," we shall fall into the trap laid for us—though that is a question that does not concern us here and now. The moral of the thing is, as we have said, that there is only one way of stopping the illegitimate methods of war so beloved of the Hun—so long as he has them to himself—and that is by adopting them ourselves and doing them much better than he. When we are fully ready and the real *strafing* of the Rhineland cities begins in the Spring, we expect to hear the poison-gas squeal again—this time against the iniquity of bombing open towns and the killing of civilians. We shall find the Hun ready and willing to call off bombing of our open towns if only we will let him alone. Without presuming to look too far into the future and to see whether or not circumstances are likely to modify present attitudes, we should say that that is all we want at the moment.

The Medical Aspects of Flying.

Sir William Cheyne, the famous surgeon and member for Edinburgh University, spoke at some length in favour of a separate medical establishment for the Air Force. The essential parts of his really able speech will be found in the summary of the debate which is printed in another section of this issue of "FLIGHT." One of his principal points—and a very valuable one—was that it is very desirable that the medical men should be in constant association with the aviators.

"High flights," he said "had a cumulative effect. One day a man might find he was not quite happy when he went so high, and that he was not quite happy in landing—in other words, that, as airmen say, he was 'getting stale.' The medical man should be on the watch for this 'getting stale.' The doctor should be in a position to say such and such a man must not go for special flights when he was not fit. A man might have 'done himself pretty well' the night before, and the doctor would have to say to him, 'My dear boy, you are not in a fit state to go up this morning.' The air service needed a better class of doctor than was wanted for the Army and the Navy. The study of the special ailments of flying men was as much a special branch as any other branch of medicine, and no medical man could reasonably be expected to become efficient in the study of these disabilities unless he was prepared to devote his whole time and energy to it. There was nothing for it but to have a special medical service for the Air Force. The idea of his Committee was that the medical men in the Army and the Navy who were already employed on Air Board service should be passed over to the Air Force. It might be said that the special medical service would be expensive. They heard the other night about an aerodrome which had cost about £500,000. That would have been enough to pay for the service. As a matter of fact two or three hours of Government expenditure would pay for the air medical service. But what was the value of an aviator and of his machine? He was told that a perfect aviator cost £900 to produce, and the machine about £4,000; so that if the machine crashed and the aviator was killed the cost was about £5,000. He did not like speaking of it in this way, because it was putting a money value on a man's life, which was wrong; he only did it to show that it was not waste. In saving a hundred men you would pay the expenses of the whole service."

In his reply to the points generally raised in the debate, Major Baird appeared to foreshadow the allocation to the Air Force of its own medical establishment. In the meantime, he stated, an agreement had been arrived at whereby it became a point of honour for the Navy, the Army and the Air Ministry to see that the medical service did its function. The main point was that there would be a body of medical men specially trained to deal with the particular aspect of cases which only occurred among people who lived in high atmospheres.

This is a side upon which we as laymen do not feel ourselves competent to sit in judgment. It is evident, however, that the special needs of the Air Force are not being lost to sight, and we have no doubt those needs can safely be left in the hands of the very able medical men who are giving the subject their especial attention.

The Gentle Art of Propaganda.

The official mind works in grooves from which it is difficult to escape, and even in such essentially modern directions as that of propaganda and general publicity it seems quite incapable of taking the broad view of things. One of the deplorable consequences of this want of outlook is that many of the official efforts to make known our war activities are defeated at their inception by the introduction of methods which are calculated to deter the very people who are willing and anxious to assist in the dissemination of the facts and figures which the Government most desires to make known to all whom they may concern. We have come across a decided case in point during the past few days. Recently it was decided to inaugurate an exhibition of portraits and photographs illustrating woman's war work, particularly regarding life in the W.A.A.C., the W.R.N.S., the R.F.C., and the W.L.A. In the ordinary course the Press at large was informed of the proposal, and, inferentially, to give publicity to the exhibition. Naturally, we were only too willing and anxious to do all in our power. Representatives were sent to the place in which the exhibition was announced to be held, accompanied by a photographer, in order that the matter might receive attention in accordance with its apparent aims and objects. We assumed, naturally, that as the exhibition was avowedly held for the purpose of "gingering up" recruiting for these women's organisations, what was wanted was all the publicity—particularly illustrated publicity—possible. Apparently we were quite wrong, since our representatives were met with an attitude of *non possumus*. There was no information worth while available, while as for permission to take photographs—well, the very idea appeared horrifying to the sapient people in charge of the exhibition. The net consequence of this attitude was that, so far as this journal is concerned, the exhibition has been left severely alone and we do not think we are immodest in saying that it is more than possible a certain number of valuable recruits have been lost to the bodies concerned. Nor have we any reason for thinking that our experience has been singular. What the net loss of publicity involved by these methods may be we do not know, but it must have been considerable. Why on earth cannot these officials, who must be aware that they know nothing at all about publicity, see to it that somebody is associated with these enterprises who knows the elements of the advertising business? No exhibition organised on commercial lines is without its Press manager, and surely it must be apparent that where the object of an exhibition is to secure something—whether it be dividends for private shareholders or recruits for war work—that end can be most certainly attained by publicity and plenty of it, especially if it costs nothing. The clear inference is that the private exhibition organiser knows his business, and, on the other hand, the official promoter is ignorant even of its A B C.

HONOURS.

Honours for the R.N.A.S.

It was announced in a supplement to the *London Gazette* on February 22nd that the King has been pleased to approve of the award of the following honours, decorations, and medal for services in action with enemy submarines:—

Distinguished Service Cross.

Flt.-Lieut. J. F. Hart, R.N.A.S.; Flt.-Lieut. J. E. Barrs, R.N.A.S.

Bar to the D.S.C.

Flt.-Comdr. J. G. Struthers, D.S.C., R.N.A.S.

Second Bar to the D.S.C.

Flt.-Comdr. J. G. Struthers, D.S.C., R.N.A.S.

The King has been pleased to approve of the award of the following honours, decorations and medals to Officers and Men of the Royal Naval Air Service:—

Distinguished Service Order.

Wing. Comdr. F. W. Bowhill, R.N.—In recognition of his invaluable services as Comdg. Officer of the R.N.A.S., employed in connection with military operations in East Africa. It is due to his experience and unceasing labour that his small unit of the R.N.A.S. has been of such assistance to the military operations. He has instilled a high sense of discipline into those under his orders.

Distinguished Service Cross.

Flt.-Comdr. W. H. Dunn, R.N.A.S.—In recognition of his services whilst employed in connection with military operations in East Africa. He did splendid work during the operations in the Lindi area, and carried out valuable bombing and reconnaissance flights.

Flt.-Comdr. G. W. Price, R.N.A.S.—In recognition of the gallantry and determination displayed by him in leading offensive patrols, which have constantly engaged and driven away enemy aircraft. On January 2nd, 1918, he observed seven Albatross scouts, and, crossing the lines in the clouds, he attacked one, which fell vertically, bursting into flames, and crashed to the ground. He has on several occasions driven enemy aircraft down out of control.

Flt.-Lieut. (now Flt.-Comdr.) A. M. Waistell, R.N.A.S.—For the determination and pluck shown by him in carrying out a bombing raid on Chanak on the night of October 17th, 1917. In spite of the fact that there was no moon and that the weather conditions were so adverse that other pilots were unable to reach the objective, he succeeded in reaching Chanak and dropping his bombs. On the return journey he hit the side of a mountain, being unable to see it on account of the darkness, the machine catching fire on crashing. Although severely injured about the face and knee he was able to climb out of the machine, and eventually reached the aerodrome, having ridden 10 miles over extremely rough country with a badly lacerated knee.

Flt.-Lieut. (Acting Flt.-Comdr.) N. M. Macgregor, R.N.A.S.—In recognition of his skill and courage in aerial combats. On December 12th, 1917, whilst leading his flight on an offensive sweep, he encountered a body of six Albatros scouts at 14,000 feet. In the general fight which ensued he attacked a scout which was engaging one of our machines, and drove it down out of control, and it was seen to crash. Acting Flt.-Comdr. Macgregor has destroyed several enemy machines, and has led his flight with great dash and judgment.

Flt.-Lieut. R. D. Delamere, R.N.A.S.—In recognition of the gallantry and devotion to duty shown by him in carrying out reconnaissance, bombing, and photographic flights during the military operations in the Lindi (East Africa) area.

Flt.-Lieut. S. M. Kinkead, R.N.A.S.—In recognition of the conspicuous gallantry and skill displayed by him in the face of the enemy in aerial combats, notably on the following occasions:—On October 24th, 1917, he brought down an enemy machine, and immediately afterwards encountered and drove off a group of seven hostile aeroplanes. On December 4th, 1917, he brought down an enemy two-seater machine completely out of control. By his skill and determination in attacking enemy machines he has always shown a fine example to other pilots.

Flt.-Lieut. J. F. Chisholm, R.N.A.S.—In recognition of his services on December 6th, 1917, when he carried out a photographic reconnaissance in the vicinity of Zeebrugge, and for the great skill and determination with which he has carried out his duties at all times.

Lieut. E. C. W. Fitzherbert, R.N.V.R.—In recognition of the valuable services performed by him as observer in the R.N.A.S. during the military operations in East Africa. His reports on the country, enemy positions, &c., and his photographs have been of the greatest assistance to the operations.

Flt. Sub-Lieut. R. McN. Keirstead, R.N.A.S.—In recognition of conspicuous gallantry in aerial combats. On Sep-

tember 24th, 1917, he engaged single-handed four enemy aeroplanes, of which two were destroyed by him. On October 21st, 1917, during an engagement between a British and a German formation, he attacked one of the enemy scouts and shot its port wings away from the rest of the machine. He then dived on to some enemy scouts which were attacking another of our machines and brought one of them down in a spinning nose dive.

Flt. Sub-Lieut. W. L. Jordan, R.N.A.S.—In recognition of the courage and initiative displayed by him in aerial combats. On July 13th, 1917, in company with another pilot, he attacked an enemy two-seater machine. After bursts of fire from both of our machines, the enemy observer was seen to collapse in the cock-pit, and the enemy aircraft was last seen disappearing among some houses. On December 6th, 1917, whilst patrolling at 15,000 feet, he saw a two-seater enemy aircraft at 10,500 feet, and dived on him, firing about 30 rounds. After falling over to the left, the enemy aircraft went down vertically. He has also been instrumental in bringing down other enemy machines.

Flt. Sub-Lieut. H. Day, R.N.A.S.—In recognition of the skill and determination shown by him in aerial combats, in the course of which he has done much to stop enemy artillery machines from working. On January 6th, 1918, he observed a new type enemy aeroplane. He immediately dived to attack, and after a short combat the enemy machine went down very steeply, and was seen to crash. On several other occasions he has brought down enemy machines out of control.

Distinguished Service Medal.

C.P.O., 3rd Gr. H. P. Eustace, O.N. F2486; P.O. T. R. Johnston, O.N. J5523 (Dec.).

"Mentioned in Despatches."

Ldg. Mech. A. G. Furber, O.N. F4979.

Foreign Decorations for the R.N.A.S.

In a supplement to the *London Gazette* dated February 22nd it was announced that the following decorations have been conferred by the Allied Powers on Officers of the British Naval Forces for distinguished services rendered during the war. The King has given unrestricted permission to the Officers and Men named to wear the decorations in question.

CONFERRED BY THE PRESIDENT OF THE FRENCH REPUBLIC.

Croix de Guerre.

Flt. Lieut. H. V. Worrall, R.N.A.S.; Flt. Lieut. A. E. Popham, R.N.A.S.; Flt. Lieut. C. G. Bronson, R.N.A.S.; Flt. Lieut. E. M. King, R.N.A.S.; Flt. Lieut. E. J. P. Burling, R.N.A.S.; Flt. Sub-Lieut. G. D. Smith, R.N.A.S.

CONFERRED BY THE KING OF THE BELGIANS.

Order of Leopold (with Swords).

Chevalier.

Wing Capt. E. L. Gerrard, D.S.O., R.N.A.S. (Major, Temp. Lieut.-Col. R.M.L.I.).

Order of the Crown.

Commander.

Flt. Lieut. G. M. T. Rouse, R.N.A.S.; Flt. Lieut. E. J. K. Buckley, R.N.A.S. (since killed); Flt. Sub-Lieut. L. F. W. Smith, R.N.A.S. (since killed); Flt. Sub-Lieut. G. W. Hemming, R.N.A.S.

Croix de Guerre.

Flt. Lieut. G. M. T. Rouse, R.N.A.S.; Flt. Lieut. E. J. K. Buckley, R.N.A.S. (since killed); Flt. Sub-Lieut. L. F. W. Smith, R.N.A.S. (since killed); Flt. Sub-Lieut. G. W. Hemming, R.N.A.S.

SPECIAL PROMOTION FOR WAR SERVICES.

Lieut. Comdr. A. A. Mellin, D.S.O., R.N., to be Comdr.; Nov. 12th, 1917.

CORRECTIONS.

In *Gazette* of Oct. 1st, 1917, for A. C., 2nd Gr., David Alexander Thomas, O.N. F17436, read Ldg. Mech. George Curzon Thomas, O.N. F3125.

In *Gazette* of December 19th, 1917, for Obs. Sub-Lieut. William Laurence Hill, R.N.A.S., read Obs. Sub-Lieut. William Laurence Hill Pattison, R.N.A.S.

D.C.M. for R.F.C.

It was announced in a supplement to the *London Gazette* on February 18th, that the King has been pleased to award the Distinguished Conduct Medal to the undermentioned for gallantry and distinguished service in the field:—

Z 151 Corpl. A. H. Mathieson, R.F.C.

A Military Medal for the R.F.C.

INCLUDED in the list of awards of the Military Medal for Bravery in the Field, announced in a supplement to the *London Gazette* of February 23rd, was the following:—
3697 Sergt. (Flight-Sergt.) N. Moore, R.F.C.

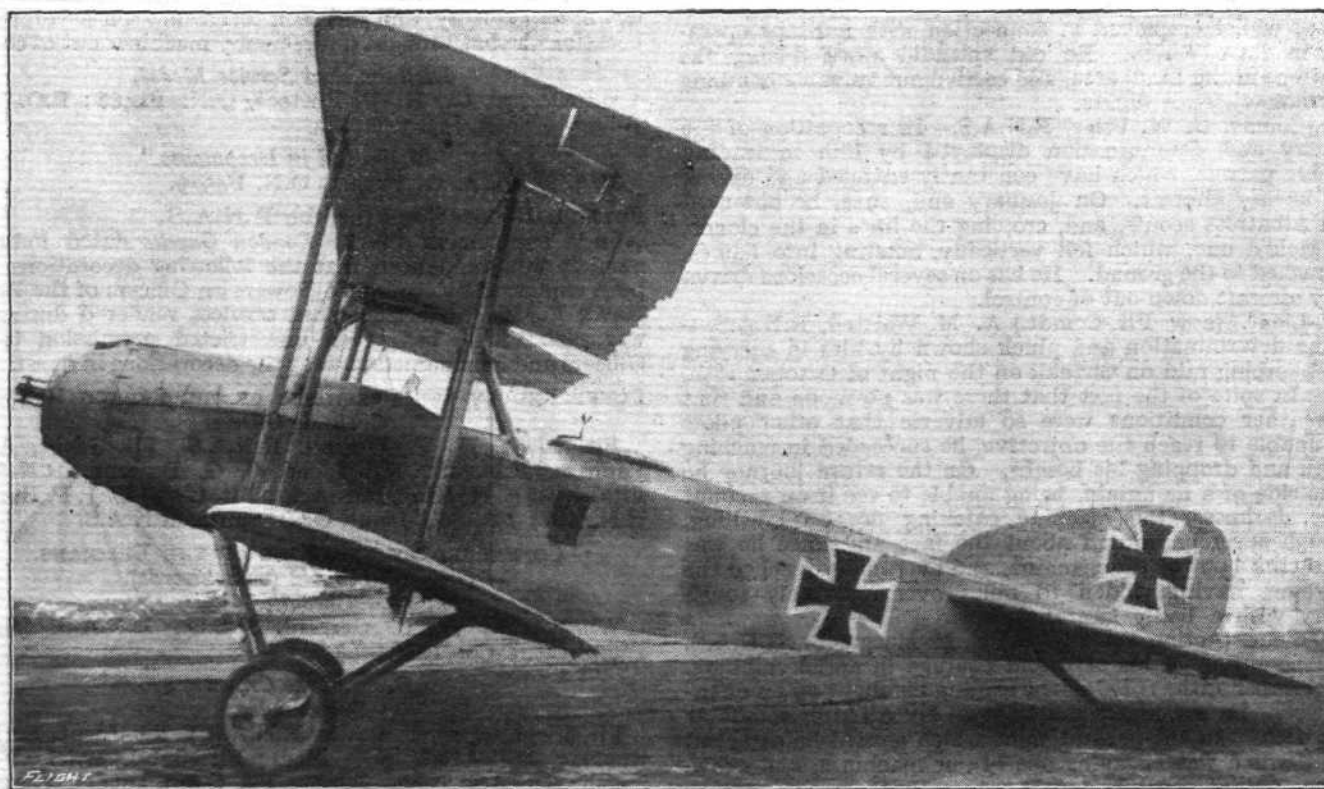
AN ALBATROS FIGHTING BIPLANE.

[Some time ago (in our issue of December 13th, 1917, to be exact) we published scale drawings and particulars of a captured German (Ago) biplane. Since then we have been, by the courtesy of the authorities, accorded every facility for obtaining full particulars of other captured German machines, and as a result we commence this week a detailed description of a very interesting enemy Albatros biplane, which has been captured practically intact. We are dealing with this machine rather more thoroughly than has usually been possible for us to do in the case of the majority of our descriptions of aeroplanes. This is partly because the machine is a very interesting one, and partly to aid those who, although the view-rooms in which these machines are exhibited are open to them at the request of their firms, live too far away, or for other reasons are unable to avail themselves of this opportunity of studying in detail modern German methods of aeroplane construction. The visitors' book at the view rooms in question reveals the fact that representatives and employees of numerous aircraft firms have taken the opportunity of paying a visit to this interesting exhibition, but it also shows that many firms, chiefly those situated far from London, are not yet to be found among the visitors. To those we therefore hope our descriptive articles will form an acceptable substitute for an examination of the actual machine. Further, among our American, French, and Italian Allies there will probably be many who would be interested in the details of a modern German aeroplane, and we therefore hope that aviation journals in these countries will consider themselves at liberty to reprint these articles. Our only stipulation is that when reprinting "FLIGHT" should be acknowledged.—ED.]

THE Albatros biplane on view at the enemy aircraft view-rooms belongs to what is now commonly referred to as the C class, that is to say, a general utility machine used for artillery observation, reconnaissance work, photography, and fighting. Incidentally the machine appears to be also used for bombing—in a small way only—as it is equipped with a bomb rack holding four bombs.

tance behind this cowl to the tail, are flat, as is also the bottom, but the top of the fuselage is covered with a curved covering of three-ply.

At the rear the fuselage terminates in a horizontal knife's edge, an easy flow being provided for the air by running the top covering of the fuselage into the three-ply covering of the fin in a smooth curve. Similarly, the fixed tail plane, which is of a sym-



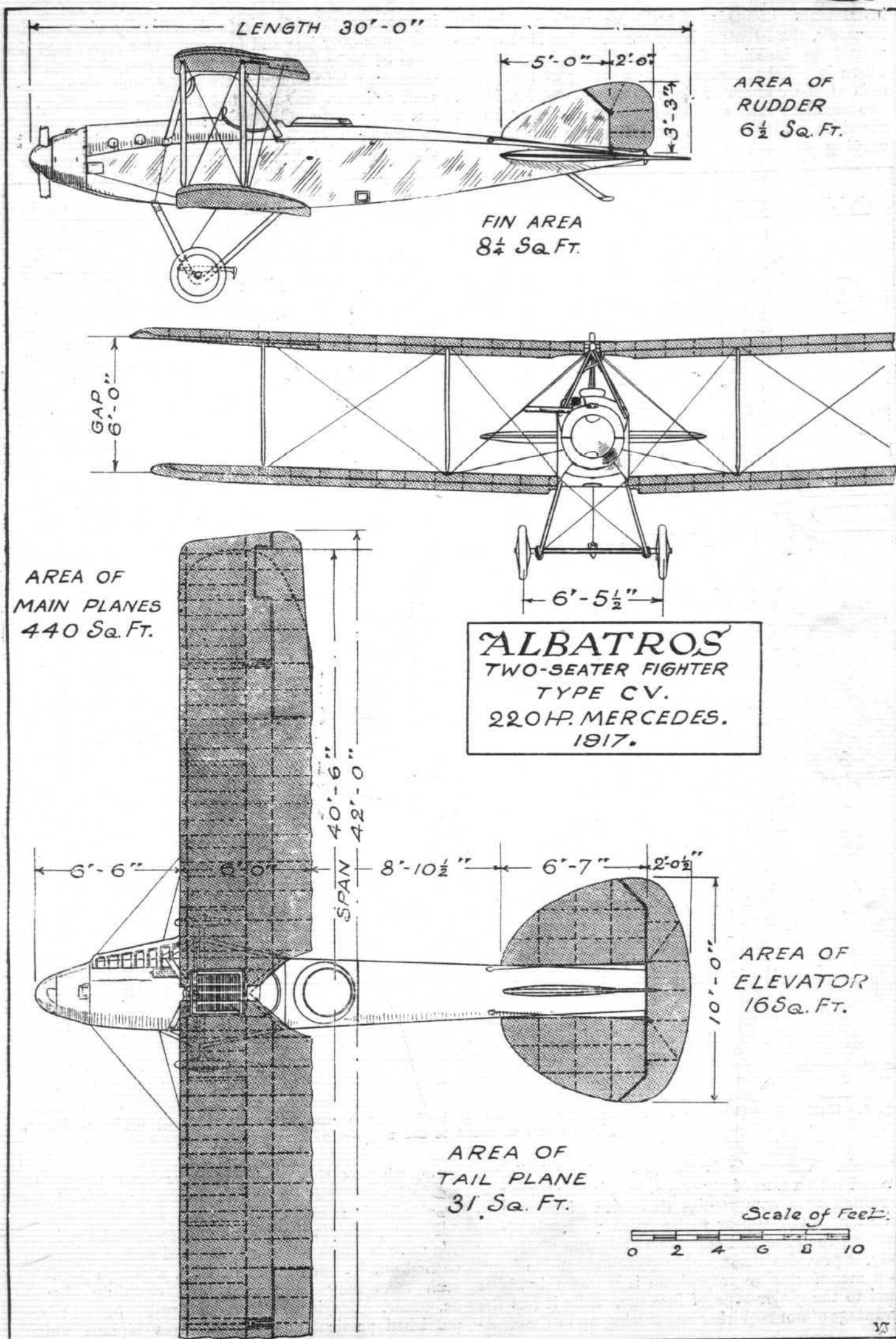
Side view of the Albatros biplane.

Aerodynamically the Albatros to be dealt with in what follows is, perhaps, chiefly interesting on account of the evident attempt on the part of the designer to provide as good a stream-line body as is possible having regard to such external fittings as machine guns, &c., which naturally detract to a certain extent from the efficiency of the lines of a body of a modern two-seater, where the gunner frequently has to stand up, with the upper portion of his body projecting above the fuselage covering. This effort at stream-lining is particularly noticeable in the nose of the machine, where the aluminium cowl over the engine is carried right across, leaving only the exhaust collector exposed. In front of the covering of the body proper is a cowl shaped as a truncated cone, which serves to enclose the nose and reduction gear of the engine, and to carry the lines of the body into those of the "spinner" around the boss of the air screw. The sides of the body, from a short dis-

metrical section and very deep, has its top surface practically in continuation of the top covering of the body, presenting no great and abrupt changes in curvature. The total effect is one of extremely smooth and easy flowing curves, and the body resistance cannot be very great in proportion to the cross sectional area of the body. We have no figures of the actual resistance coefficient in the formula $R = k AV^2$, but are inclined to imagine that the coefficient k has quite a low value.

As regards the rest of the machine, the Albatros designer does not appear to have been so careful in cutting down resistance. For instance, the wings have the usual circular section stranded cables for taking lift and landing stresses, and no attempt appears to have been made at stream-lining these.

Constructionally the Albatros shows much that is of interest, chiefly in the construction of the body, but also in other respects, as we hope to show in later



THE ALBATROS BIPLANE.—Plan, front and side elevation to scale.

instalments of this descriptive article. Fundamentally, the Albatros body construction is that employed in building light boats and hydroplanes. There is a light framework, consisting of four main rails at the corners of the rectangular section body, two auxiliary rails somewhere about half-way up on the sides, and bulkheads or transverse partitions of varying shape and thickness along the body at

ing process, this following automatically when making the parts over jigs and formers. One advantage this form of body does appear to possess, although to a somewhat lesser extent than the true *monocoque*—shell splinters and rifle and machine gun bullets are less likely to damage it seriously than is the case with the girder type. In the latter, should a longeron be shot through nearly all the strength of the structure is

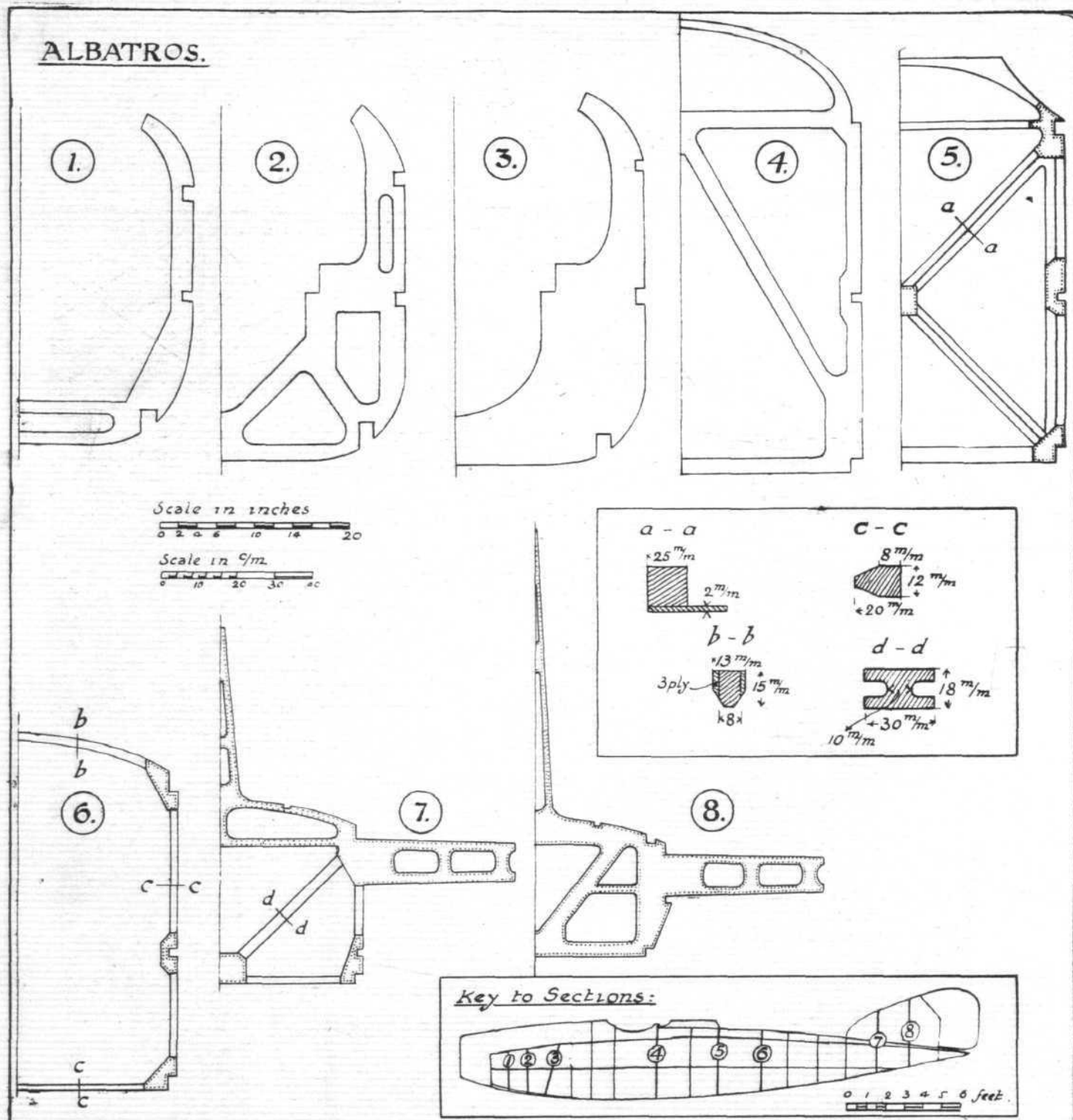


Fig. 1.—Half sections of [some of the more important bulkheads of the Albatros fighting biplane. Inset, dimensions of some of the members.

intervals. The whole is then, as in boat building, covered with a skin of ply-wood, in this case three-ply. Regarded as a compromise this form of body construction would appear to be quite good. Without entailing the time and expense of the true *monocoque* body, it provides a reasonably good stream-line form. As a manufacturing proposition it is probably about equal to the girder type of fuselage, while it has the advantage of not requiring any trueing up in the erect-

gone, whereas this semi-*monocoque* structure would retain its strength even after damaging some of the longitudinal members.

Finally, there is the question of strength for weight. We have no data relating to tests of such a structure carried out by our own authorities, although possibly such tests may have been, and certainly should be, made. But in our issue of April 4th, 1914, we published particulars of an Albatros biplane which

was brought over to this country and flown here by Thelen, which had a body fundamentally similar to the one at present under discussion, although differing from it in minor details. At the time we were furnished with some particulars of tests carried out on an Albatros fuselage of this type by the *Deutsche Ver-*

justified in concluding that the bending resistance of the veneer type of body is greater than that of a cross wired fuselage of the same weight, although no actual figures were given showing how much greater.

When looking into the detail construction of the Albatros body, the first thing that impresses one, apart

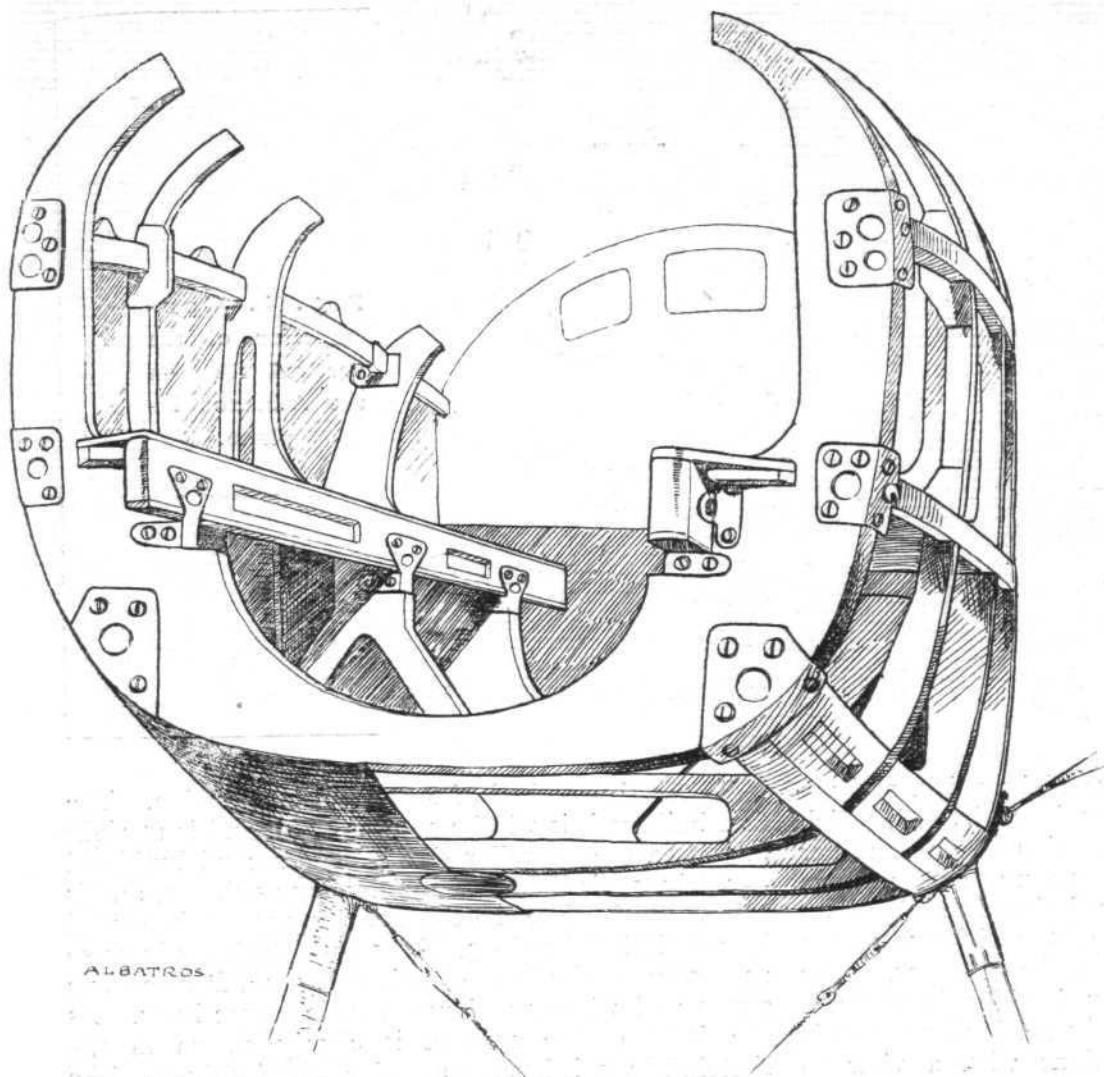


Fig. 2.—Sketch showing engine bearers of the Albatros biplane.

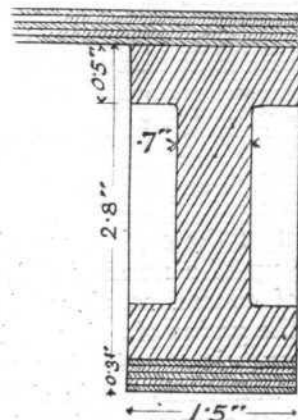


Fig. 3.—Section of the engine bearers of the Albatros biplane.

suchsanstalt für Luftfahrt, according to which the factor of safety of the Albatros body was about 60, and the resistance to bending 2.5 times greater than that of a diagonally wired fuselage of the same outside dimensions, and having members of the size usually employed in structures of this type. The *Versuchsanstalt* also stated that the Albatros firm were

from the absence of internal cross bracing, is the extensive use that has been made of ply-wood in the construction of the transverse bulkheads or formers, which take the place of the struts and cross members of the girder type of body. In Fig. 1 are shown the different bulkheads of the body, with dimensions, &c. The rail half-way up the sides of the body is



Three-quarter rear view of the Albatros biplane.

placed parallel with the propeller shaft, thus serving as a datum line from which to make measurements of distances and angles.

In order to enable our readers to better form a conception of the Albatros construction we have shown, in Fig. 1, half-sections of the more important and representative bulkheads. In the front portion of the body the bulkheads, which here have to take the

utilising pieces of wood that would otherwise have had to be scrapped. On the other hand it may have been done to increase the amount of crossing of the different grains. In any case, it would appear to serve both purposes, although one would expect the time taken in manufacture to be somewhat increased by such careful fitting together of small pieces of wood.

Fig. 2 shows the nose of the Albatros, and clearly

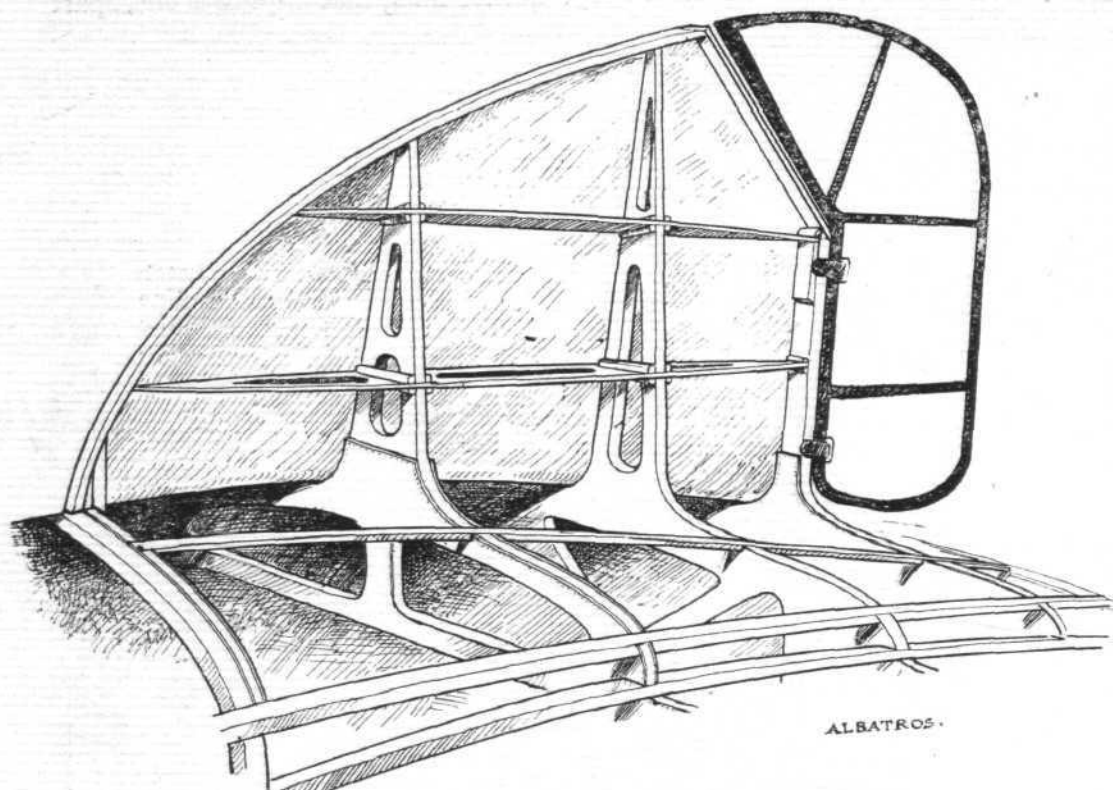
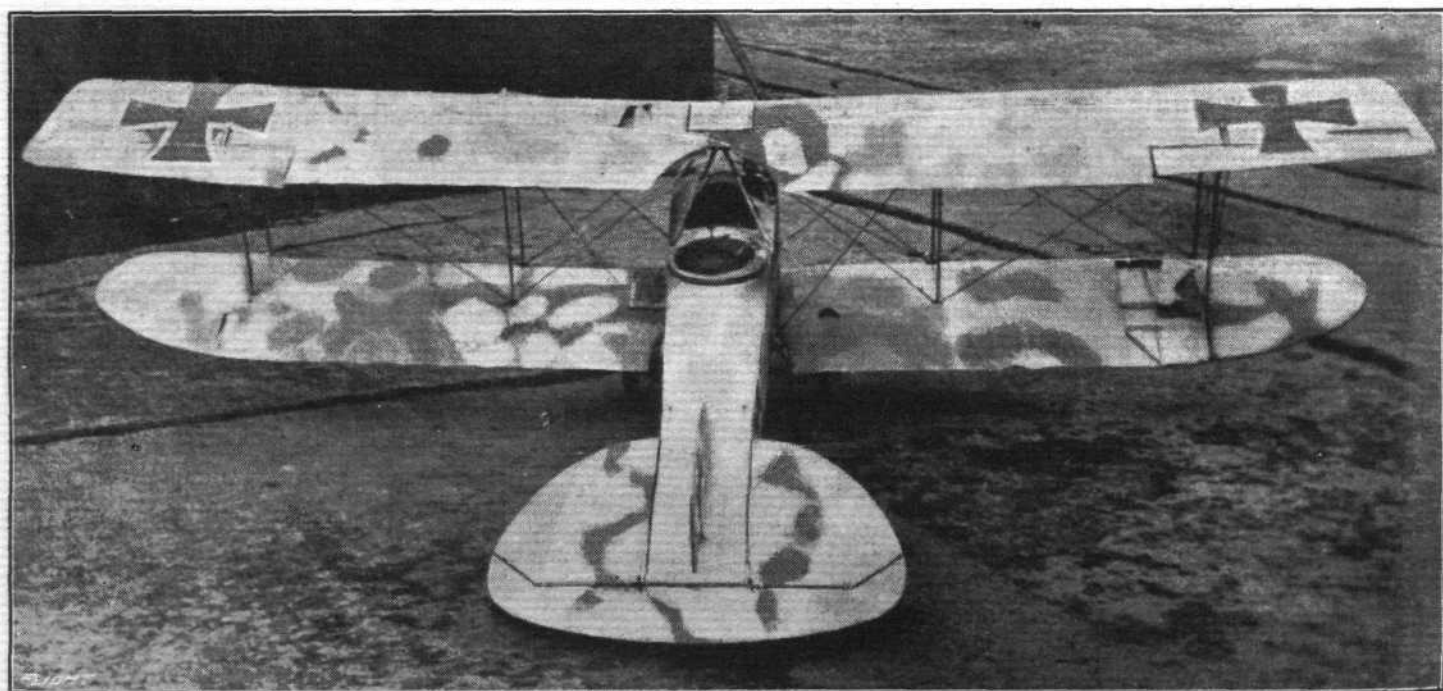


Fig. 4.—Construction of the vertical fin on the Albatros biplane.

weight of the engine, are about $1\frac{1}{4}$ in. thick, and are made up of a number of laminations of wood, which are, of course, so placed in relation to one another that the grains of adjacent layers run at angles to one another. It was further noticed that in making up these bulkheads whole sheets of the different woods were not always employed. On the contrary, many of the layers appear to have been shouldered or spliced, being made up of comparatively small pieces. It is possible that this has been done with a view to

indicates the method of supporting the engine. The first bulkhead, it will be seen, is solid, and is at right angles to the propeller shaft. The second bulkhead—2, Fig. 1—is lightened by piercing as shown, and is also vertical, while the third engine support is formed by a solid bulkhead—3, Fig. 1—which slopes back so as to support the front chassis struts and front cabane struts at its lower and upper ends respectively. As the front engine support is clearly shown in the sketch, Fig. 2, it has not been included in Fig. 1. The



View from above of the Albatros biplane.

bulkhead numbered 1 in Fig. 1 is merely a former, and does not help to support the engine bearers. These are of I section spruce, and have plywood flanges top and bottom as shown in Fig. 3. The upper flange is continued outwards to the middle longeron so as to form a shelf or bracket at the sides of the engine.

A construction somewhat different to that of the engine supports is employed in the panel between the pilot's and gunner's cockpits. This consists (4, Fig. 1)

front of this partition, having in it pockets for maps, &c.

From this point back to the point where the tail plane and vertical fin are attached, the formers of the body are in the nature of a very light framework of thin struts, a typical one being shown in 6, Fig. 1. The general construction and some of the dimensions of the various members will be clear from the illustration.

One of the features in which the present Albatros

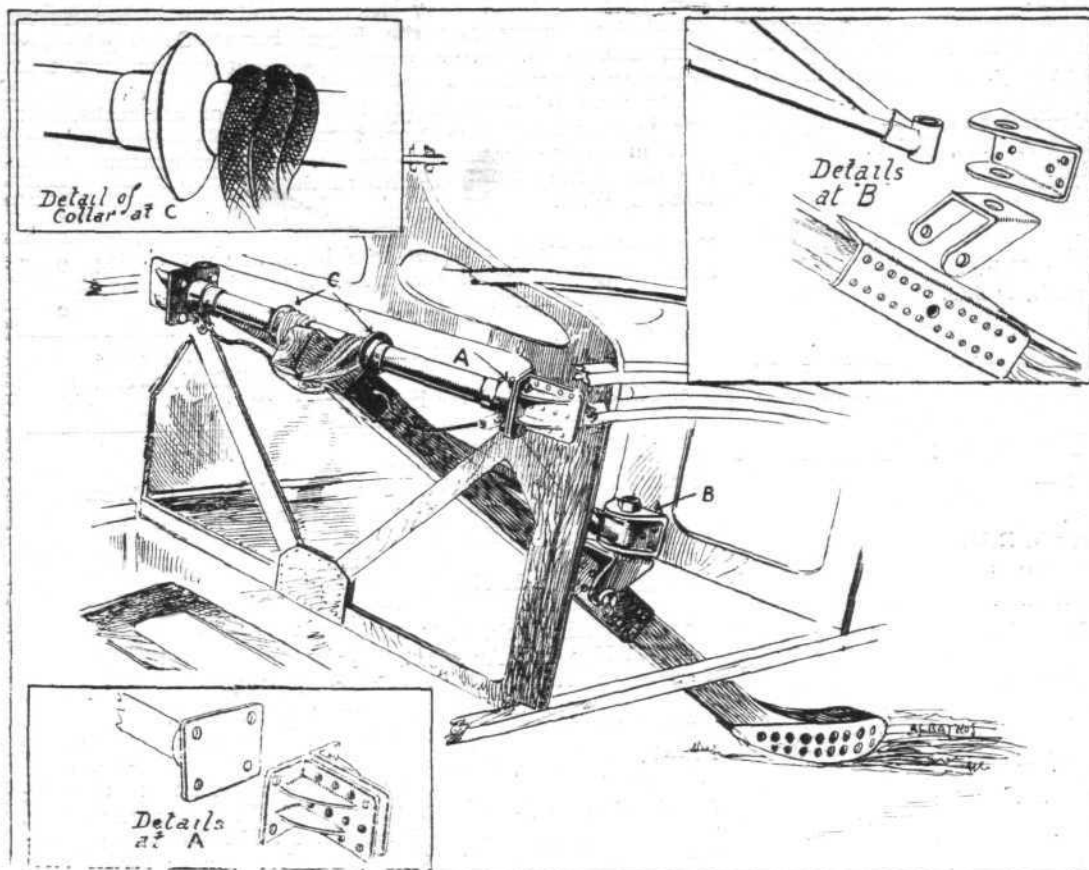


Fig. 5.—The tail skid and its attachment on the Albatros biplane. Inset, upper right-hand corner, details of the skid pivot. Upper left-hand corner, the collar which prevents the rubber cord from slipping along the tube. These collars are apparently made up of two stampings—bowl-shaped—welded together along their peripheries. In the bottom left-hand corner is shown the bracket attaching the cross tube to the plywood bulkhead.

of a spruce framework faced each side with 3 mm. three-ply, the whole having a thickness of 26 mm. (about 1 in.). Behind the gunner's cockpit is a light partition built up as shown in 5, Fig. 1. Two light spruce struts run diagonally across from corner to corner of the body, crossing in the centre of the fuselage at which point they are reinforced by three-ply facings and triangular blocks glued into the corners.

Their attachment to the upper and lower body longerons is of a similar construction, and will be clear from the diagram. On their front faces these diagonal struts are provided with a 2 mm. flange to stiffen them against buckling. A canvas curtain is secured to the

differs from previous types is the construction and attachment of the tail plane and vertical fin. The latter is covered with three-ply, and is made integral with the body, out of which it grows, so to speak. The construction is shown in 7 and 8, Fig. 1, and in the perspective sketch, Fig. 4. The tail skid is supported on one and sprung from the other of these two bulkheads, as illustrated in Fig. 5, the general and detail construction of it being evident from the sketches. The tail plane is provided with hollow spars which fit over cantilever beams integral with bulkheads, 7 and 8, Fig. 1, the details of which arrangement will be dealt with later.

(To be continued.)

Changes in the R.F.C.

It was announced in the *London Gazette* on February 20th that the following temporary appointment had been made at the War Office:—

Director-General of Military Aeronautics.—Brevet-Colonel (temporary Brigadier-General) E. L. Ellington, C.M.G., R.A., from Deputy Director-General, and to retain his temporary rank while so employed, and to remain seconded (January 14th).

The next day the following was gazetted:—

Attached to Headquarters Units.

Commanding.—Bt.-Col. (temp. Maj.-Gen.) J. M. Salmond, C.M.G., D.S.O., R. Lanc. R., and to retain his temp. rank whilst so employed. *vice* Maj.-Gen. Sir H. M. Trenchard, K.C.B., D.S.O., January 18th, 1918.

Major-General Salmond was appointed Director-General of Military Aeronautics in October last, and Brigadier-General Ellington was appointed Deputy Director of Military Aeronautics in November.

Air Council's Permanent Secretary.

It was announced on February 21st that the Secretary of State for Air had appointed Mr. W. A. Robinson, C.B., C.B.E., Assistant Secretary, His Majesty's Office of Works, to be Permanent Secretary to the Air Council in the Air Ministry.

Medals for Fire Rescue Work.

AMONG the awards recently made by the Society for the Protection of Life from Fire are the following:—

Bronze medal and three guineas to Corporal H. Smith, Royal Fusiliers Record Office. On November 28th the biplane of Lieut. F. C. Cunningham, R.F.C., failed to clear some trees at Hounslow and came down in flames, and Corporal Smith extracted the pilot.

Five guineas to Trooper A. Codman, 1st Life Guards, who during the raid on December 6th, when an incendiary bomb fell through the roof of a hotel, ran upstairs with a pail of water, in which he placed the blazing bomb, and put out the fire it had caused.

ROYAL AERO CLUB OF THE U.K.

OFFICIAL NOTICES TO MEMBERS.

ANNUAL GENERAL MEETING.

THE Annual General Meeting of the Members of the Royal Aero Club of the United Kingdom will be held on Wednesday, March 27th, 1918, at 3, Clifford Street, New Bond Street, London, W.1, at 6 o'clock.

Notices of motion for the Annual General Meeting must be received by the Secretary not less than 21 days before the meeting, and must be signed by at least five members. The last day for the receipt of notices of motion is Wednesday, March 6th, 1918.

Committee.

In accordance with the rules, the Committee shall consist of 18 members. Members are elected to serve for two years, half the Committee retiring annually. Retiring members are eligible for re-election.

The retiring members of the Committee are:—

Brig.-Gen. The Duke of Atholl, M.V.O., D.S.O.

Lieut.-Col. W. D. Beatty, R.E.

Brig.-Gen. W. S. Brancker, R.F.A.

G. B. Cockburn.

Lieut.-Col. F. Lindsay Lloyd.

Major J. T. C. Moore-Brabazon, R.F.C.

Commander C. R. Samson, R.N., D.S.O.

A. Mortimer Singer.

T. O. M. Sopwith.

Any two members of the Club can nominate a member to serve on the Committee, provided the consent of the member

has been previously obtained. The name of the member thus nominated, with the names of his proposer and seconder, must be sent in writing to the Secretary not less than 14 days before the Annual General Meeting. The last day for the receipt of nominations is Wednesday, March 13th, 1918.

THE FLYING SERVICES FUND, administered by THE ROYAL AERO CLUB.

THE Flying Services Fund has been instituted by the Royal Aero Club for the benefit of officers and men of the Royal Naval Air Service and the Royal Flying Corps who are incapacitated on active service, and for the widows and dependants of those who are killed.

The fund is intended for the benefit of all ranks, but especially for petty officers, non-commissioned officers and men.

Forms of application for assistance can be obtained from the Royal Aero Club, 3, Clifford Street, New Bond Street, London, W. 1.

Subscriptions.

	£	s.	d.
Total subscriptions received to Feb. 19th, 1918	12,614	9	7
Staff and Workers of Gwynnes, Ltd. (fifty-seventh contribution)	10 12 1

Total, February 26th, 1918 12,625 1 8

H. E. PERRIN, Secretary.

3, Clifford Street, New Bond Street, W. 1.

THE ROLL OF HONOUR.

REPORTED by the Admiralty:—

Killed.

Flt. Sub-Lieut. C. R. C. Wallworth, R.N.

Accidentally Killed.

Proby. Flt. Officer A. E. Gullett, R.N.

Died of Wounds.

Sub-Lieut. R. E. Burr, R.N.

Missing (feared Killed).

Flight-Lieut. C. C. Purdy, R.N.

Wounded.

Flight Sub-Lieut. D. A. McCoach, R.N.V.R.

Flight Sub-Lieut. G. O. Smith, R.N.

Missing.

Flt Comdr. G. W. Prince, R.N.

Previously Missing, now reported Prisoner.

Sub-Lieut. A. G. Beattie, R.N.

Reported by the War Office:—

Killed.

Lieut. W. B. Andrew, Cent. Ont., attd. R.F.C.

Lieut. R. J. N. Dale, Manch., attd. R.F.C.

Lieut. T. McK. Hughes, K.R.R.C., attd. R.F.C.

Lieut. D. G. McLean, R.F.C.

2nd Lieut. F. G. Todd, Glouc., attd. R.F.C.

67753 and Air Mech. W. G. B. Collingham, R.F.C.

Previously Missing, now reported Killed.

Lieut. E. S. Bacon, R.F.A., attd. R.F.C.

Lieut. J. C. Bush, M.C., Dorset R., attd. R.F.C.

Lieut. W. W. Chapman, Buffs, attd. R.F.C.

2nd Lieut. D. G. Clark, Aus. F.C.

Capt. H. B. Coomber, Manch. R., attd. R.F.C.

Capt. F. R. Cubbon, M.C., I.A., Inf., attd. R.F.C.

Lieut. D. B. Davies, R.F.C.

2nd Lieut. J. M. De Lacy, W. Yorks, attd. R.F.C.

Lieut. A. M. T. Glover, K.O.S.B., attd. R.F.C.

Lieut. M. C. Hartnett, R. Muns. Fus., attd. R.F.C.

2nd Lieut. H. R. Hicks, R.F.C.

2nd Lieut. J. D. Laing, R.F.C.

2nd Lieut. G. A. C. Manley, R.F.C.

Lieut. W. L. O. Parker, Hrs., attd. R.F.C.

2nd Lieut. J. H. R. Salter, R.F.C.

2nd Lieut. L. P. Sidney, K.R.R.C., attd. R.F.C.

2nd Lieut. W. R. S. Smith, R.F.C.

2nd Lieut. O. B. Swart, R.F.C.

Died of Wounds.

Lieut. E. B. Nelson, Aus. F.C.

Capt. K. Shelton, Buffs, attd. R.F.C.

Accidentally Killed.

Lieut. C. H. Harding, Som. L.I., attd. R.F.C.

Previously Wounded and Prisoner, now reported

Died of Wounds as Prisoner in German hands.

2nd Lieut G. R. Gray, R.F.C.

Previously Missing, now reported Died of Wounds as Prisoner in Bulgarian hands.

2nd Lieut. J. R. F. Gubbin, R.F.C.

Drowned.

32897 2nd Air Mech. G. Clark, R.F.C.

Died.

3795 1st Air Mech. A. E. Bainbridge, R.F.C.

336 T. Kenning, Aus. F.C.

99468 2nd Air Mech. T. G. Reece, R.F.C.

Missing (believed Drowned).

The following unless otherwise stated are mechanics in the R.F.C., the figure in brackets indicating the grading:—

16851 (1st) J. Brotherton; 81833 (2nd) A. S. Carroll; 58685 (2nd) F. J. Dilley; 56504 (2nd) F. A. Frank; 27249 (1st) S. G. Gray; 64199 (2nd) H. E. Handscombe; 80043 (2nd) W. C. Hatton; 85472 (2nd) W. Jones; 26050 (1st) J. H. Keyte; 22942 (1st) H. E. Ladd; 75208 (2nd) R. C. Laycock; 54724 (2nd) J. Matthews; 81559 (2nd) R. Meade; 89865 (2nd) A. L. Moore; 16987 (1st) G. Murrell; 106748 Cpl. H. J. Nicholls; 85341 (2nd) M. Power; 82007 (2nd) J. N. Shepherd; 81560 (2nd) J. B. Standing; 81678 (2nd) J. Walker; 64131 (2nd) T. Young.

Wounded.

Capt. H. N. W. Bean, R.F.C.

2nd Lieut. F. R. Hunt, R.F.C.

Lieut. A. A. Mitchell, R.F.A., attd. R.F.C.

42079 2nd Air Mech. A. Haggart, R.F.C.

Previously reported Prisoners, now reported Wounded and Prisoners in German hands.

2nd Lieut. T. W. Calvert, R.F.C.

2nd Lieut. J. Chapman, High. L.I., attd. R.F.C.

2nd Lieut. E. B. Denison, R.F.C.

2nd Lieut. J. C. Garratt, R.F.C.

Capt. R. A. Logan, R.F.C.

2nd Lieut. R. S. Phelan, R.F.C.

Lieut. S. H. Taylor, R.F.C.

Lieut. J. G. Young, Leins. R., attd. R.F.C.

45286 2nd Air Mech. W. Holman, R.F.C.

87657 1st Air Mech. G. Leach, R.F.C.

Previously reported Wounded, now reported Not Wounded.

11954 2nd Air Mech. G. P. Carr, R.F.C.

Missing.

2nd Lieut. O. G. S. Crawford, R.F.C.

2nd Lieut. F. Felding-Clarke, R.F.C.

2nd Lieut. F. D. C. Gore, R.F.C.

Capt. S. J. Sibley, R.F.C.

107629 2nd Air Mech. R. F. Lee, R.F.C.

Previously Missing, now reported Prisoners in German hands.

2nd Lieut. F. W. Dogherty, R.F.C.

2nd Lieut. F. M. Ohrt, R.F.C.

2nd Lieut. A. H. Peile, R.F.C.

Previously Missing, now reported Prisoner in Turkish hands.

Lieut. L. H. Pakenham-Walsh, Ches., attd. R.F.C.

ANSWERS TO CORRESPONDENTS.

[As a number of letters reach us signed with initials only, some of which do not give a complete address, we would point out that such communications cannot be dealt with in our columns. Full name and address, which will not be published, must always be given.—ED.]

E. T. B. F. (Caversham).—The rear *cabane* struts do not, we think, form an inverted Vee in the type 11 Nieuport, although they do in some of the other types. The landing wires are run from the top of the *cabane* struts, and the lift wires from the bottom of the body near the points of attachment of the chassis struts. In order to be able to design an aeroplane you will have to be capable of making all the necessary calculations, aerodynamical as well as structural, and we should recommend you to study "Aeroplane Design" by F. S. Barnwell, "The Design of Aeroplanes" by A. W. Judge, both of which may be obtained from the offices of "FLIGHT," the prices being 2s. 10d. and 14s. 6d., post free, respectively. In addition you would do well to get hold of as many of the N.P.L. reports as possible, and to study technical articles appearing weekly in the aeronautical press.

E. N. (Birmingham).—1. This machine is a Bristol Fighter. 2. No scale drawings of recent Sopwith machines have appeared, as publication is not permitted, but scale drawings of the original Sopwith "Tabloid" were published in "FLIGHT" of December 20th, 1913, a copy of which can be obtained from our offices, the price being 1s. 3d. Yes, there is such a machine, but the span is, we think, about 18 ft.

S. G. B. (Wantage).—There is no simple method by which an observer on the ground can ascertain with any degree of accuracy the height of an aeroplane. The machine in question is, we believe, an R.E.8. Only machines of R.A.F. design are classified with the letters F.E., B.E., R.E., and S.E.; the Nieuport scout would not, therefore, be classed under any of these letters.

F. L. H. (Trowbridge).—A detailed description and scale drawings of the 80 h.p. Avro biplane was published in "FLIGHT" of December 6th, 1913, a copy of which can be obtained from our offices. The price is 1s. 3d.

F. F. R. (Edgbaston).—It is not, we think, possible to obtain anywhere drawings, &c., of present-day British aeroplanes

Three Week's Work.

THE Air Ministry issued the following announcement on February 26th:—

"*Western Front.*—From February 1st to 22nd inclusive 75 enemy aircraft were brought down by the R.F.C. During the same period 39 enemy aircraft were driven down out of control—a total of 114. During the same period six enemy aircraft were brought down by anti-aircraft defences and infantry.

"Against these 120 machines of the enemy, 28 of our own are missing.

"The weight of bombs dropped during the month up to February 22nd has been 65 tons.

"*Italian Front.*—Since the arrival of the British airmen on the Italian front up to the present time, 58 enemy machines, principally German, have been destroyed. Our losses for the same period are eight. Many hostile machines have been driven down out of control."

The King at an Air Station.

VERY interesting, because of the circumstances under which it was held, was the investiture by the King at an air station on the East Coast on February 26th, when the following decorations were conferred:—

D.S.C. and Two Bars.—Squadron-Commander D. Hallam, R.N.A.S.

Bar to D.S.C.—Flight-Commander B. D. Hobbs, R.N.A.S.

D.S.C.—Flight-Commander J. O. Galpin, R.N.A.S.; Flight-Lieutenant C. L. Young, R.N.A.S.; Flight-Lieutenant N. A. Major, R.N.A.S.; Lieutenant Martin Smith, R.N.R.; Lieutenant Norman Baker, R.N.R.; Lieutenant F. J. Woods, R.N.R.; and Skipper Francis Thompson, R.N.R.

D.S.M.—First-class Air Mechanics, R.N.A.S., E. H. Clarke, H. L. Curtis, W. L. Blackstock, G. H. Robinson,

for the purpose of study, as publication is not permitted. The question of two-bladed or four-bladed air-screws is to a large extent determined by the type of engine employed for driving them. Some engines are designed to have the air-screw mounted direct on the crankshaft, while in others there is a reduction gear. Thus, for instance, in the Renault and R.A.F. engines the air-screw is mounted on an extension of the cam shaft, which is made strong enough to take the load. This means, of course, that the screw is running at half the engine speed, and to get better efficiency for the slow-moving screw four blades are frequently employed. On the other hand, there are engines of higher power than the R.A.F. or Renault in which this reduction gearing is not incorporated, and which drive the screw direct. Hence it is quite possible to see a higher powered engine driving a two-bladed screw and another engine of lower power driving a four-bladed one. To the best of our knowledge no aviator has ever looped with the wheels of his machine pointing inwards towards the centre of the loop. We even doubt whether this would be possible, as the wings are very inefficient in the reversed position. However, the modern small high-power machine seems to be capable of most extraordinary evolutions, even to almost helicoptering, so it is difficult to say. If it were possible the pilot would undoubtedly be flung out of his seat by centrifugal force, unless, as is now nearly always the case, he was strapped in.

H. B. (B.E.F.).—The late Lieut. Warneford was awarded the V.C. for bringing down a Zeppelin on Belgian territory. He did not bring down a Zeppelin in this country.

F. P. S. (Golders Green).—We are not prepared to admit that the machine you mention was unsuccessful. On the contrary, it was, we believe very much liked by pilots. We have never heard that it suffered from "abnormal vibration," and certainly if there was any undue vibration in the machine you refer to it could not have been caused by the engine, as thousands of other machines are fitted with the same type engine. By "negative angle" is meant an angle downward from the horizontal. The dihedral angle is the upward slope from root to tip of an aeroplane wing. As the name implies, an inter-plane strut is a strut between upper and lower wings of a biplane.

and C. H. Spikings, together with second-class Air Mechanic E. M. Nichol, R.N.A.S.; P.O. R. P. Eaglestone, P.O. J. Denby, Leading Seaman A. J. Buckeridge, Leading Signaller W. R. Barge, R.N.V.R., Engineman J. W. Siddie, R.N.R., and Second Hand Alfred Mitchell, R.N.R.

New German Methods.

"THE enemy now sends out his airmen very often in large parties," says Mr. Hamilton Fyfe in a message to the *Daily Mail* from France. "Sometimes as many as 15 fly together. Six is a common formation. Two of our photographing machines were attacked yesterday by half a dozen of the enemy's. They were annoyed at having to suspend their picture-taking on such a good day. However, they took to their guns with so vigorous an indignation that in a very short while they had knocked out two of their attackers. The rest then flew away and the photographers went on photographing.

"Once a single British machine was set upon by six Germans. One of them was brought down immediately; then the leader challenged the Englishman to single combat. The latter shot him. Now the sportsmanlike course would have been for the others to take their turns one by one. Instead of that they all dived at the Englishman at once. He saw that he had only one chance of escape. This was to fly very low. He dropped and almost skimmed the tops of the trees and the roofs of buildings. So he got home safe."

Germans Using Triplanes.

"THE Germans, by the way, are much increasing the number of triplanes which they use," says the *Daily Telegraph's* correspondent in France. "It is a compliment to us, because we had them first, and if they had not proved themselves annoying and formidable adversaries the Germans would hardly now be copying them as lavishly as they are."

INTERNATIONAL AIRCRAFT STANDARDS.

(Continued from page 205.)

2W1—Mill Specifications for Aircraft Douglas Fir.

REGION—1. All Douglas fir timber used in the production of this material shall have grown in the north Pacific coast timber region of western Oregon and Washington and near-by regions of British Columbia.

TIMBER—2. The trees used in the production of this lumber shall be preferably of the "young yellow fir" type, and shall be in a healthy condition at the time of felling. Brashy lumber characteristic of old, overmature, or decadent yellow fir trees will not be accepted.

LOGS—3. The logs from which the material is produced shall be preferably "butt" logs, and in no case shall "top" logs be used.

GRAIN—4. All grain shall be straight; that is the angle of deviation from a line parallel with the edges shall not exceed 1 in 30 (1:30) on surfaces with diagonal grain and 1 in 20 (1:20) with spiral grain. Stock 4 ins. and thicker may be flat grains, and stock less than 4 ins. thick shall be vertical grain.

TEXTURE—5. (a) The wood shall be strong, tough, and elastic. Brashy pieces will not be accepted.

(b) The rate of growth of any piece shall not be less than 30 annual rings to each 3 ins. (76.2 mm.) when measured in a radial direction on either end section through the zone of maximum growth. Furthermore, no single in. (25.4 mm.) shall have less than 8 annual growth rings.

KNOTS AND BURLS—6. (a) Not less than 90 per cent. of the total footage of each shipment shall be free from knots of all kinds, and from burly, curly, gnarly, and irregular grain, on all four sides of each piece.

(b) In the pieces comprising the balance of the shipment (10 per cent. or less) knots and burls or similar irregularities of grain or other defects will be allowed, provided the buyer is able to obtain cuttings from each piece which are clear, sound, straight-grained, and not less than 5 ins. (127 mm.) wide and 16 ft. (4.88 m.) long. Not more than 25 per cent. of the total volume of each piece shall be discarded in sawing out cuttings.

PITCH POCKETS—7. (a) One pitch seam or pocket not to exceed 2 ins. (50.8 mm.) long or its equivalent in minor pockets (provided they are not in the same annual ring) will be allowed in either or both faces of each piece 16 to 31 ft. (4.88 to 9.45 m.) long and two such pockets or their equivalent in either or both faces of each piece 32 to 40 ft. (9.75 to 12.19 m.) long. Pieces shorter than 16 ft. (4.88 m.) and pieces narrower than 6 in. (152.4 mm.) shall be free from pitch pockets.

(b) Pieces having pitch pockets too large or too numerous to be allowed as defined in paragraph 7 (a) will be inspected in the same manner as for knots and burls as specified in paragraph 6 (b).

SAP—8. Bright sap will be allowed in any piece, provided it does not extend more than one-fourth the width of the piece or one-third its length.

ROT AND SHAKE—9. All pieces shall be free from rot, shake, dote, red heart, purple heart, and all other forms of decay.

TOOL MARKS AND OTHER DEFECTS—10. Pieces must be free from picaroon holes, hook marks, and other defects caused by handling-tools, and equipment.

WANE—11. Wane will be allowed on occasional pieces, but in no case shall it exceed either one-fourth the thickness, one-eighth the width, or one-sixth the length of the piece.

DIMENSIONS—12. Percentages of various thicknesses, widths, and lengths, and the respective percentages of flat and vertical grain stock to be supplied are subject to special arrangement between the purchaser and contractor at the time prices are fixed.

TOLERANCES—13. (a) Thicknesses may be scant not to exceed $\frac{1}{8}$ in. (3.18 mm.) on occasional pieces. If more than $\frac{1}{8}$ in. (3.18 mm.) scant they will be accepted at contractor's option and tallied in the next inch class below.

(b) Widths may be scant not to exceed $\frac{1}{8}$ in. (6.35 mm.) on occasional pieces. If scant more than $\frac{1}{8}$ in. (6.35 mm.) they will be accepted at contractor's option and tallied in the next inch class below.

(c) Lengths may be scant not to exceed 2 in. (50.8 mm.) on occasional pieces. If scant more than 2 ins. (50.8 mm.) they will be accepted at contractor's option and tallied in the next 1-ft. class below.

LOADING—14. Shipment is to be loaded and covered in the manner prescribed by the purchaser.

3S22—Specifications for Mild Carbon Steel Tubes.

GENERAL—1. The general specifications 1G1 shall form, according to their applicability, a part of these specifications.

USE—2. These tubes are suitable for all parts not heavily stressed, such as trailing edges and elevators.

MATERIAL—3. The I.A.S.B. standard steel No. 1020 shall be used. The composition is as follows:

	Per cent.
Carbon	0.15-0.25
Manganese30-.60
Phosphorus, maximum045
Sulphur, maximum050

MANUFACTURE—4. The tubes are to be of the cold-drawn, seamless type and are to be furnished annealed.

Any tube may be rejected at any time because of injurious defects or faults in the steel which are revealed by manufacturing operations, notwithstanding the fact that it has previously passed inspection. Such rejected material shall be returned to the manufacturer at the latter's expense. This clause shall not apply to materials fabricated after export.

WORKMANSHIP AND FINISH—5. The tubes are to be smooth, of the section specified, and within the permissible tolerances as to wall thickness, of uniform diameter, free from scale, dirt, specks, longitudinal seaming, lamination, grooving, and blistering, both internally and externally.

PHYSICAL PROPERTIES AND TESTS—6. The tubes shall have the following physical properties:

Tensile Test—(a)

Minimum tensile strength, 60,000 lb. per sq. in. (42.18 kg./mm. ²).
Minimum yield point, 36,000 lb. per sq. in. (25.31 kg./mm. ²).
Minimum elongation, 25 per cent. in 2 in. (50.8 mm.), or 10 per cent. in 8 ins. (203.2 mm.).

Crushing Test—(b) The test specimen shall be crushed endwise until the outside diameter is increased in one zone by 25 per cent., or until one complete fold is formed. The specimen shall stand this treatment without cracking.

SELECTION OF TEST SPECIMENS—7. One test specimen for the tensile test shall be chosen from every 400 ft. (121.9 m.) of tubing and one test specimen for the crushing test from every 100 ft. (30.5 m.) of tubing.

The specimens for the crushing tests shall have a length of 1.5 times the diameter of the tube.

Whenever possible the selection of test specimens shall be made by heats.

DIMENSIONS AND TOLERANCES—8. (a) The following tolerances will be allowed on the outside diameter of tubes:

Tubes under 1.5 in. (38.1 mm.) diameter, ± 0.003 in. (0.08 mm.).
Tubes over 1.5 in. (38.1 mm.) diameter, ± 0.005 in. (0.13 mm.).

The manufacturer and purchaser shall agree upon tolerances for couliissant or telescoping tubes.

(b) The variation in wall thickness may be ± 10 per cent. of the dimensions specified.

(c) In no part of any tube shall the departure from straightness exceed 1 in 600.

DELIVERY, PACKING, AND SHIPPING—9. All tubes shall be well oiled and delivered in boxes not exceeding 220 lbs. (100 kg.) gross weight.

3N3—Specifications for Phosphor Bronze Castings for Bearings.

GENERAL—1. The general specifications, 1G1, shall form, according to their applicability, a part of these specifications.

USE—2. This material is suitable for liners in babbitted bearings.

MATERIAL—3. The chemical composition shall be as follows:

	Per cent.
Copper	79.00-81.00
Tin	9.00-11.00
Lead	9.00-11.00
Phosphorus	0.10-0.30
Total impurities, maximum	0.25

MANUFACTURE—4. (a) The material shall be made from lake or electrolytic copper conforming to the I.A.S.B. specification 2N2 and from pig tin at least 99 per cent. pure.

(b) No scrap shall be used other than that produced in the manufacturer's own plants and which is of the same composition as the material specified.

WORKMANSHIP AND FINISH—5. Castings shall be homogeneous and free from shrinkage cracks, spongy spots, blow-holes, and foreign matter. Castings in which defects are revealed by machining operations shall be replaced by the manufacturer. The full weight of the original material in rejected castings shall be returned to the manufacturer.

DIMENSIONS AND TOLERANCES—6. Castings must be true to pattern; cores must be correctly placed. Surfaces which are to be machined shall admit of finishing to the required dimensions without leaving any trace of the original surface.

(To be continued.)

AIRISMS FROM THE FOUR WINDS

SOUTHEND, in spite of—or is it in consequence of?—its very large share of Hun strafing from the air, is making a big bid to lead in the presentation of "Town" aeroplanes. The Mayor, Aldermen Joseph Francis, has taken hold of the organisation of "Business Men's Week" in March for the town with both hands, and his set purpose is to raise the money for the purchase of 150 aeroplanes. Mr. Francis himself starts the ball rolling with a promise of £10,000.

LIGHT blue for the Air Force uniform *sounds* a bit drastic. It will be a case of literally waiting and seeing. The suggestion in one quarter that the colour scheme is the selection of a fine-weather pilot, with the idea of camouflaging himself against the cerulean blue, need hardly be seriously entertained. For the present, anyway, khaki will still be the Air Force colour, except some possible examples after hours. The "'plane-Blue" Staff tabs are very distinctive.

Nor only are the constructional figures of the U.S. air fleet colossal, but apparently the vogue of our Allies' Air Service itself is equally great. From a report to hand last Saturday the progress of the aviation recruits in the South, where the climate permits of instruction throughout the year, is highly reassuring. The Americans are showing themselves well adapted by temperament for flying, and the service is becoming so popular that young men are actually on the waiting lists eager to commence work before the training of the first squadron is complete.

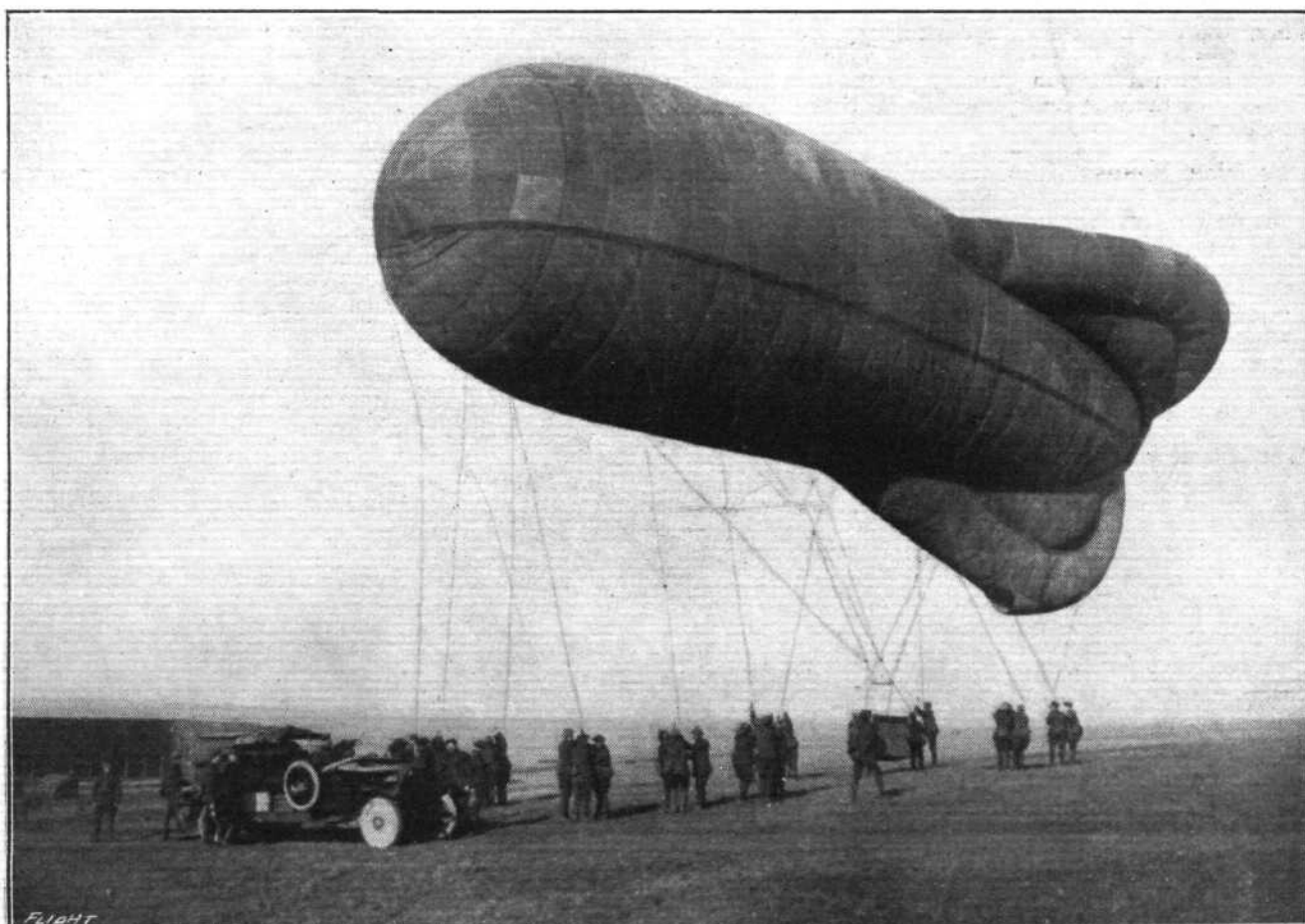
It really would appear as if Mr. Ernest S. Brown, of Milton Street, were more than justified in his indictment of some one (or more) of our Government Departments for permitting the export of that all-important aeroplane material, flax,

made up and otherwise, as he now draws attention to the Board of Trade returns of last month, from which the export was still apparently proceeding, the figures being linen piece goods 7,476,400 yards, and thread for sewing 132,400 lbs. The galling part of the whole business is that our merchant service conveyed the raw material from Russia to this country at the peril of their lives. Mr. Brown points out that with the acquisition of Courland the world's supply of flax passes into the hands of Germany, and adds sarcastically that the shortage of flax will soon be felt in a very marked degree, but probably the Minister of Blockade will overcome the difficulty by sanctioning the issue of *licences to trade with the enemy*, as Mr. Runciman did when we found ourselves destitute of dyes in 1915.

ACCORDING to a Rome report, the raid on Port Buccari by Gabriele d'Annunzio has brought the Italian poet a reward in the form of an English decoration. He certainly deserves one.

If the German authorities are to be believed, no damage whatsoever to bother about is or has been done by any of our air visits to towns in Hunland. Evidently some of the German States have a different estimate of their troubles, as after long negotiations between the Baden Government and the German Imperial Chancellor and Imperial Treasury, the Grand Duchy of Baden has notified that it adheres to its claim for an advance of over £25,000 for compensation for damages done by enemy airmen.

ALTHOUGH we do not suggest that the German pilot, as a class, is anything but a brave man, the story that comes to hand from an English nurse, home on leave from France, of a German aviator's fatal funk in the presence of danger, is



(British Official.)

An observation balloon about to ascend to watch enemy movements on the British western front in France.

typical of Hun mentality. The aviator had taken part in a recent raid on London. On the return journey his machine was crippled and he was forced to descend in France. The crew were captured, and it was found that one of them was badly injured in the knee. He was sent to a hospital, where he boasted of the ruin and deaths caused by German bombs in London. Two nights later an air raid by his own comrades took place in the neighbourhood of the hospital in which he lay. So terror-stricken was the wounded man that he clambered out of bed and tried to seek refuge in a room below. In his condition of helplessness and fright he fell headlong down the stairs, sustaining fatal injuries. It strikes us that the result is a good riddance of such a warrior, who is so little unable to appreciate the piquancy of goose sauce when applied to the gander.

It does not appear to be an unreasonable request which the London authorities are being asked to urge upon the Government, to reimburse the cost, whole or a part of making good

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WAR SAVINGS WEEK

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CERTIFICATES

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And so play YOUR part in Civilization's Great Struggle.

Our Gallant Soldiers, Brave Sailors, and Daring Airmen WILL DO THE REST

NAVAL

One of the discs (half size) which were scattered broadcast in connection with the Kensington War Savings Week, from a British naval airship.

damage done by enemy bombs to public buildings, sewers, and other underground works. It is surely a National item which might well go into the six or seven million odd daily war bill.

APROPOS the note the other week, as to Krupps being rebuilt underground, Mr. Franklin C. Murdock, a well-known engineer who has recently arrived in New York from the German border, re-affirms this to be a fact. Southern Germany, south of Dusseldorf, is dark at night, he says, and this is already having its effect on the German people. The cities were darkened early in January for the first time since the outbreak of the war, and people realise that this is not a sign of victory.

"BUY WAR BONDS" is a suggestive slogan which our postal authorities have recently copied from our American Allies, as an obliterating stamp on letters through the post. A second one which has now made its appearance in the United States is practical and should be very helpful to this country in mitigating its meagre, but healthy, war rationing. "Food will win the war; don't waste it" is how the new obliterating legend runs. It might well be grafted on to our cancelling stamps, to alternate with the "Buy War Bonds" brand. Each is as important as the other in engendering the "will to win the war" spirit into the entire nation.

It's a hellish story our French contemporary *L'Homme Libre* published last week in regard to the tearing away from their homes of a thousand hostages (Mme. Reuter, wife of the manager of the Longwy Steel Works, being amongst the number, it is said) by the German military authorities in Northern France for internment in Holzminden camps. These wretched victims, our contemporary asserts, on the authority of a reliable witness, were subjected to the most infamous treatment. Some 30 women hostages, who refused to make sacks for the enemy, were shut up in Shed No. 13

—unlucky 13 again—without food and without daylight. They remained there from August 13th—the 13 again—to September 19th, 1917, and would have starved had not food been smuggled in from time to time by charitable hands. They were forbidden any article of toilet from 4 p.m. to midnight. As they refused to capitulate, their mattresses and bed coverings were taken away, and, finally, their woollen underwear. Their martyrdom was cut short by a providential visit to the camp by a delegate of the Spanish Legation at Brussels. They were released one hour before his arrival, but he was informed all the same of these revolting facts. The following is the text of an order "for the women's camp," dated September 14th, 1917:—

"The measures taken in regard to the inmates of Shed 13 have not yet produced any result. Consequently, in agreement with the camp commander, I order that these women receive no letters, cards or parcels. Moreover, they are to remain without bed coverings and pallets. I shall punish without pity, those (feminine) who pass them forbidden articles, and especially food.

"(Signed) Letule, Lieutenant Assistant to Camp Officer."

MAJOR BAIRD, when paying a tribute to the work of instructors, in the House of Commons, said the position had thus been bluntly summed up by an officer of great experience:—"They spend many hours every fine day in the air with a young man who is doing his best, quite unintentionally, but nevertheless with disconcerting determination, to break their necks."

VIRTUE its own reward. A boy, charged at the Guildhall on Saturday, with stealing a cheque for £22 belonging to his employers, had several very lucky escapes in air raids. A bomb fell in the back garden of his home and blew out the window of the kitchen where he was sheltering. On the night he stole the cheque he was sheltering in an archway when a bomb dropped and killed some people standing near, but he received no injury other than shell shock. Taking the view that the shock had temporarily upset the boy's mental balance, the magistrate sent him home with his father.

ONE of the German pilots who participated in the recent air raid on Paris, in an account in the Berlin *Lokal-Anzeiger* of his experiences during this trip, says:

"Suddenly the French put 'lanterns' in our way. Above and beneath us, ahead and astern, they hung quietly in the air, and with their blinding glare lighted up our planes. They are rockets with parachutes provided with very brightly burning fuses. Some special mechanism enables them to remain steady for a full minute in the air. Sometimes dozens together appeared near us to show our machines to the anti-aircraft guns."

TEN YEARS AGO.

Excerpts from the "Auto." ("FLIGHT's" precursor and sister journal) of February, 1908. "FLIGHT" was founded at the latter end of 1908.

U.S. ARMY AEROPLANES.

Following our announcement, in our issue of January 18th, that the U.S. Army had invited tenders for heavier-than-air flying machines, comes the news that Mr. Taft, Secretary for War, approved the recommendation by the Board of Ordnance accepting three bids to supply the Government with aeroplanes. Among the tenders is, it is announced, one from the Brothers Wright, for a flying machine, to be delivered within 200 days at a cost of £5,000.

GASTAMBIDE-MENGIN AEROPLANE.

On Saturday, February 8th, the Gastambide-Mengin aeroplane was taken out to make its first attempt at flight, and was so far successful as to rise from the ground to an altitude of some 5 metres, and make a jump through the air of about the same distance. The sudden termination of the embryo flight was brought about purposely by the mechanician, Boyer, who switched off the ignition in order to avoid a tendency to capsize.

climbing for planes of that type. The engine production which began a month ago is now on a quantity basis, and the highest point of production will be reached in a few weeks. Only the 12-cylinder type was being made, as developments abroad had made it wise to concentrate on the high-powered engines instead of the 8-cylinder ones.

Mr. Baker added that in the past month the latest types of foreign machines had been adapted to American manufacture. The industry had increased at least twenty-fold, the training machine problem had been solved, and the production of fighting aeroplanes had begun.

"X 90" Raid (February 17th-18th).

THE official Press Bureau on February 20th announced that the total casualties caused in the air raid of the night of February 17th-18th, were: Killed, 19; injured, 34.

American Fighting Machines Coming.

It was announced in Washington on February 21st by Mr. Baker, the U.S. Secretary for War, that the first American-built battleplanes are en route for France, nearly five months ahead of the scheduled time. These planes have the first Liberty motors from machine production, one of which in a recent test is said to have surpassed all records for speed



PERSONALS

Casualties.

Lieutenant GEOFFREY PERCIVAL BULMER, K.S.L.I., and attached R.F.C., who was killed on February 15th, aged 22, was the eldest son of Mr. and Mrs. H. P. Bulmer, Longmeadow, Hereford.

Lieutenant ROBERT JACOMB NORRIS DALE, Manchester Regiment, attached R.F.C., who was killed in action on January 31st, aged 33, was the eldest son of Mr. and Mrs. Bernard Dale, of Wimbledon. He obtained his commission in June, 1915, and was promoted in July, 1917.

Second Lieutenant EDMUND SHARINGTON DAVENPORT, R.F.C., was educated at Christ's Hospital, Cork Grammar School, and Skerries College, Cork. He joined the R.F.C. as cadet in April, 1917, and obtained his commission in three months, receiving his pilot's wings in October. He went to the front in November, and was killed on January 3rd, while flying over the German lines on patrol duty. Second Lieutenant Davenport, who was 22 years old, was the only son of the late Captain E. H. Davenport, R.N., and Mrs. Davenport, of Park View, Cork, and grandson of the late Rev. E. S. Davenport, of Davenport House, Shropshire.

Captain JOHN SHERIDAN GREGORY, R.F.C., formerly A.S.C., who has just been reported killed on the Western front, was the younger son of Lieutenant-Colonel G. M. Gregory, V.D., and of Mrs. Gregory, of Gunterstone Road, West Kensington, and was 28 years of age. Educated under Mr. George Egerton, of Somerset Street, he proceeded to Westminster School, and after going through the usual course there, entered Trinity College, Cambridge, and took up Law as his subject. He graduated in 1911, having passed Law Tripos, Parts I and II., and obtained his degrees of B.A. and LL.B. He then entered the Middle Temple as a student to qualify as a barrister-at-law. When war broke out in August, 1914, he had passed all the Bar examinations except the final. With regard to military duties he had enlisted in the Officers' Training Corps (Army Service Branch) a couple of years before the outbreak of war, with the special intention of becoming proficient in riding and driving, and by August, 1914, he had just qualified for and received Certificate A. Naturally in 1914 he at once joined that branch of the Service and proceeded to France as second lieutenant. In 1917 he got attached to the Royal Flying Corps, in which he qualified as an observer, and was preparing to go through the training of a pilot. A fortnight before his death he received the 1914 Star for his past services in France.

Lieutenant J. P. BEVAN HAROLD, R.F.A., attached R.F.C., was the eldest son of the late Dr. John Harold and of Mrs. Harold, of Harley Street, W. He was educated at Beaumont College, Old Windsor, and University College, Oxford, and was 23 years of age. He was studying medicine at Oxford when the war broke out, and at once volunteered for service, obtaining his commission within a fortnight. He served in France for two years, and a year ago was attached to the R.F.C., receiving his pilot's certificate last August. He returned to the front last December, and while photographing over the German lines was attacked by two enemy machines. After a severe struggle he succeeded in returning to the British lines, but he had received a serious wound, from which he died on February 16th. His younger brother, Midshipman Geoffrey Harold, was lost when H.M.S. Hogue was sunk in 1914.

Lieutenant ALFRED JONES HOMERSHAM, London Regiment and R.F.C., who was killed in action on February 18th, aged 26, was the second son of Mr. and Mrs. A. W. Homersham of Lampeter, Woking.

Lieutenant HUMPHREY BRYAN THOMASSON HOPE, Northamptonshire Regiment and R.F.C., aged 20, who was reported missing on April 26th, 1917, and now presumed to have been killed on that date, was the younger son of the late W. Hodgskin Hope, surgeon dentist, Wellingborough, and of Mrs. Hope, of "The Chalet," Old Hunstanton. He was attacked by six hostile machines when over the enemy lines, and was shot down fighting against impossible odds. He

was a skilled and daring pilot, and had acted as instructor before going oversea. He was educated at Wellingborough School, and was a student at the Royal Dental and Middlesex Hospitals, London, when he obtained a commission in the Northamptonshire Regiment in November, 1915. His elder brother, Captain W. K. T. Hope, is serving in Egypt.

Second Lieutenant PETER FRANCIS KENT, Pilot, R.F.C., who was killed in action on February 6th, aged 19, was the younger son of Ernest and Lily Kent, of Aldenham, Herts.

Flight Lieutenant J. LIONEL, of the Australian Flying Corps, who died on December 18th, 1917, of injuries received while in action, was the eldest son of Mr. and Mrs. Montague Sandy, "Blenheim," Burwood, N.S.W. He was 32 years of age.

Captain JOHN REGINALD PHILPOTT, M.C., R.F.C., whose death is reported as having taken place on January 15th, was the only child of Canon J. N. Philpott and Mrs. Philpott, of Southchurch Rectory, Southend-on-Sea. Born in 1893, he was educated at Windlesham House, Brighton, whence he obtained a foundation scholarship at Marlborough. After two years at Magdalen College, Oxford, he obtained a commission, in August, 1914, in the Suffolk Regiment. He transferred to the R.F.C. in August, 1915, obtained his "wings" in November, and went to France the following month. After nearly a year's service there, during which he obtained the M.C., he received his promotion as Flight Commander, and after a further period of home service he was sent with his squadron to another front in June, 1917. There he was taken prisoner on September 25th when flying on reconnaissance, being brought down owing to the failure of his engine.

Flight Lieutenant C. H. MURRAY CHAPMAN, R.N., who was accidentally killed on February 23rd, whilst flying, was the elder son of Mr. and Mrs. Capel Chapman. His age was 25.

Lieutenant F. R. COOK, East Yorkshire Regiment, attached R.F.C., who was accidentally killed on February 22nd, whilst flying abroad, aged 20, was the elder son of Mr. and Mrs. J. W. Cook, St. Aubyn, Hardy Road, Blackheath, S.E.

Lieutenant GEOFFREY EDGAR CUSHING, who was accidentally killed while flying in England on December 29th, 1917, was the youngest son of Mrs. Charles Cushing, 555, Mount Pleasant Avenue, Westmount, Montreal, Canada. His age was 19.

Lieutenant HENRY ARTHUR EDWARDES, R.F.C., who was accidentally killed on February 16th, while flying near London, was the second son of Henry Grant Edwardes, Sawston, Cambs.

Captain KENNETH LLOYD GOSPILL, East Surrey Regiment, attached R.F.C., second son of Mr. and Mrs. T. F. L. Gospill, of Cheam, Surrey, was born at Handsworth, Staffordshire, in 1897, and educated at King Edward's School, Aston, Birmingham, and Alleyn's School, Dulwich. He was apprenticed to Tangyes, Soho, and was studying for matriculation at the Birmingham University when the war broke out. He enlisted in the 14th Royal Warwick Regiment on September 17th, 1914, a few days before his 17th birthday, and served six months. In March, 1915, he was gazetted to the East Surrey Regiment, and in January, 1916, was attached to the R.F.C. He served seven months in France with a fighting squadron, and returned home on December 15th, 1916, being employed on the staff of the Central Flying School, Upavon. He was gazetted Lieutenant on September 5th, 1916, and temporary Captain and Flight Commander on March 1st, 1917, and returned to the front as Flight Commander in May, 1917. He was wounded on July 12th, 1917, and was appointed deputy instructor in England last November. He went to the front again on February 12th last, and was killed in a flying accident on February 15th.

Second Lieutenant LESLIE LAST, R.F.A., attached R.F.C., who was accidentally killed abroad on February 21st, aged 23,

was the youngest son of Mr. and Mrs. A. W. Last, Bolton House, Sutton, Surrey.

Lieutenant HAROLD A. LAWS, Can. Machine Gun Co., attached R.F.C., who was accidentally killed whilst flying in Norfolk on February 23rd, aged 23, was the only child of Augustus W. and Edith Laws, of 46, Cannon Hill Lane, Merton Park, Surrey, and Winnipeg, Manitoba.

Second Lieutenant A. F. X. TURNBULL, who died on February 9th, as the result of an accident when flying, was the youngest son of Robert Turnbull, of San Miguel, Mexico, aged 20.

Married.

On February 21st, at the Church of the Holy Rosary, Second Lieutenant VALENTINE A. R. ABBOTT, A.F.C., son of Mr. and Mrs. Arthur Abbott, of Perth, Western Australia, was married to DAPHNE, youngest daughter of the late Hon. W. E. MARMION and Mrs. Marmion, of Western Australia.

On February 18th, at All Saints', Southend-on-Sea, Lieutenant ARTHUR GEORGE BEWES, R.F.C., was married to GLADYS MARY, daughter of Mr. GEORGE EDWARD SQUIRE, High View, the Cliff, Westcliff-on-Sea.

The marriage between Major ALAN DORE, D.S.O., Worcestershire Regiment and R.F.C., son of Mr. and Mrs. S. L. Dore, of Pinner Hall, Pinner, and MIRLE, elder daughter of Mr. and Mrs. E. A. MAUND, of Frognal, Hampstead, took place quietly on February 20th at the Parish Church, Hampstead.

On February 18th, at St. Andrew's, Westminster, Second Lieutenant GRAFTON SAMUEL EDWARD LEES, Australian Flying Corps, only son of the late Hon. S. E. and Mrs. Lees, of Sydney, Australia, was married to DORIS, eldest daughter of the late L. C. and Mrs. RUSSELL-JONES, of Sydney, Australia.

At St. Mary Abbot's Church on February 25th the wedding took place of Captain SIDNEY ROBERT STAMMERS, R.F.C., eldest son of Mr. and Mrs. S. J. R. Stammers, of Beaconsfield, Gunnersbury, and MURIEL, only daughter of Mr. and Mrs. H. G. MUSKETT, Gerrard's Cross. Captain Stammers was accompanied by Mr. Tryggor Gran, the famous young Norwegian aviator, who has now joined the British Air Service, as his best man.

To be Married.

The engagement is announced of Captain RICHARD WILKINSON DAWES, the Prince of Wales's (North Staffordshire) Regiment (T.F.), attached R.F.C., youngest son of Mr. and

Mrs. Edwin Dawes, of Sutton House, Long Sutton, Lincolnshire, to RUBY GRACE APELINA, only daughter of Mr. and Mrs. John St. C. UPTON, of Market Drayton, Shropshire.

A marriage has been arranged, and will take place at 11.45 on March 6th, at Holy Trinity Church, Darlington, between Lieutenant AUBREY W. HIGSON, A.S.C., attached R.F.C., youngest son of Mr. Jacob Higson, of Rossland, Northwood, Middlesex, and VERA MARGUERITE, youngest daughter of Walter W. STORR, J.P., of Uplands, Darlington.

The marriage arranged between Acting Major E. B. B. JEFFERSON, The King's Liverpool Regiment and R.F.C., son of Mr. and Mrs. T. E. Jefferson, Ballahott, Isle of Man, and MURIEL, eldest daughter of Mr. and Mrs. J. HOLLAND CHESHIRE, of Hallwood, Neston, Cheshire, will take place in April at the Parish Church, Neston.

Items.

Major-General Sir HUGH TRENCHARD (Chief of the Air Staff) and Major General E. B. ASHMORE (Commanding London Air Defence Area), had the honour of being received by the King at Buckingham Palace, on February 21st.

Brigadier-General ELLINGTON, the new Director-General of Military Aeronautics, was born in 1877, entered the Royal Artillery in 1897, and has seen active service during the present war, being twice mentioned in despatches and awarded the C.M.G. He was appointed Deputy Director of Military Aeronautics last November.

Mr. WILLIAM ARTHUR ROBINSON, who has been appointed permanent Secretary to the Air Council, was born in 1874. He was educated at Appleby School and Queen's College, Oxford, and entered the Colonial Office in 1897, taking first place in the Civil Service examination, and became a first class clerk in 1905. He was Assistant Secretary to the Imperial Conferences of 1907 and 1911, and Secretary to the Dominions Royal Commission, 1911-12. In the latter year he was appointed Assistant Secretary to the Office of Works.

The sudden death, on February 21st, is announced of THOMAS TYRER, F.I.C., of 14, Sandwell Mansions, Hampstead, N.W., Managing Director of Thomas Tyrer & Co., Ltd., Stirling Chemical Works, Stratford, and Director of Cellon, Ltd., and Hon. Treasurer of the Society of Chemical Industry, aged 76.

The will of Lieutenant HAROLD HAMER, R.F.C., of Blackpool (killed on June 6th last), has been proved at £15,558.



Fatal Accidents.

CADET C. B. NICHEL, of the American Flying Service, attached to the R.F.C., died on February 19th, from injuries received in an aeroplane mishap in the Eastern Counties.

At an inquest at Hounslow on February 20th, on Cadet H. K. Bulkley, of the American Air Service, attached to the R.F.C., who was killed on February 18th, he was described by his Flight Commander as an exceptionally good pilot. After flying for 20 minutes he was gliding down, with the engine off, but finding he had not sufficient room to land he switched on again. In rising his machine struck the under carriage of another machine and fell between 60 and 70 feet to the ground. It was stated that neither pilot could see the other. A verdict of "Accidental Death" was returned.

Lieut. G. N. Middleton, R.F.C., was killed while flying near Montrose on February 21st.

Firemen's Gallant Air-Raid Work.

THE Fire Brigade Committee, in a report presented to the London County Council on February 19th, says that the Chief Officer has commended in brigade orders, for their services in saving several lives at a fire caused by bombs from hostile aircraft, nine members of the brigade and one member of the London Volunteer Rifles—namely, Station Officers D. A. Linder, W. Hollington, and T. M. Crowe; Sub-Officer A. A. Weller; and Firemen A. E. Barber, B. S. L. Best, F. J. Parker, R. M. Burton, and A. H. Ruck; and Lance-Corporal H. E. Wheller.

They also mention the work of Dr. Somerville Hastings, of the Middlesex Hospital, who, they state, "in rendering medical attention to a man who was pinned under some debris, shared the risks of members of the fire brigade, regardless of the fact that he had no helmet or other protection and the debris was falling." Two men of the London Salvage corps, named George Henry Nichols and Robert William

Dobbing, also performed equally meritorious work to that of the members of the fire brigade.

Another London-Rome Flight.

ON February 21st a British aeroplane landed on an aerodrome near Rome, having flown from London, with stops at Paris, Lyons, Marseilles, Nice, and Pisa. The occupants were Flight-Comdr. Leslie and Air-Mechanic Hatch, who made the same journey last December.

An American Tribute to Captain Ball.

THE Aero Club of America have written to Alderman Ball stating that they are sending to the family the special war medal of the Aero Club of America—the highest honour they can bestow—which has been awarded to the late Capt. Ball.

Aero Exhibitions Banned in U.S.

A PROCLAMATION has been issued in the United States prohibiting the holding of any expositions of aircraft throughout the present war in the United States or its possessions.

Guildford to Provide Twenty-five Aeroplanes.

IN connection with the Special War Savings Week from March 4th to March 9th, when, to stimulate the movement, it is proposed to raise funds equivalent to the provision of some definite weapon or weapons of warfare, Guildford is considering a proposal to raise a sum which would represent 25 aeroplanes, at a cost of £2,500 each, or a total of £62,000. Similar requests, the amounts asked for being based on population, are being made to other towns in Surrey.

Lively Doings at Irish Aerodrome.

ON the night of February 16th, reports the *Irish Times*, six cyclists rode to an aerodrome which is being constructed in County Dublin, entered a hut where there were two night watchmen, and threatened them with revolvers while the place was being searched. The men, who wore handkerchiefs over their faces, carried away several maps, a theodolite, and a number of papers.

THE AIR FORCE DEBATE.

In presenting the Estimates for the Air Force in the House of Commons on February 21st, Major Baird, the Under-Secretary of State to the Air Ministry, said:—

The House will probably expect that I should report the progress that has been made in the creation of the Air Force and of the Air Ministry since it was set up by the Act passed last Session. Before doing so, I hope that the House will allow me to draw attention to a point which, I think, is of importance. Parliament has endorsed, and emphatically endorsed, the view of the Government that the Air Force should be considered and treated as a fighting force separate from the Navy and the Army, and, since we are engaged in war, it has to be remembered that the danger of drawing undue attention to any particular branch of our fighting services must be guarded against. There is no Air Force Estimate produced in Germany or in Austria, and I would venture to suggest to hon. members the necessity, while criticising to the full extent that they may desire the operations of the Air Ministry, for remembering that we must not, either by question or by answer, give any information to the enemy which may render the task of our airmen more difficult and dangerous than it is already. I do not in the least wish to stifle criticism, but I do think it is necessary, in presenting for the first time a Vote which draws special attention to a most important branch of our fighting services, both on land and on sea, to emphasise the necessity for restraint in the matter of questions at this time. Since the passing of the Air Force Act the ground has been explored by a strong Inter-Departmental Committee under the chairmanship of General Smuts, and matters were advanced sufficiently to enable the Air Council provided by the Act to be set up by an Order in Council of December 21st last. Since that date the organisation of the Ministry has proceeded satisfactorily. A Central Branch, or Secretariat, has been organised, a Finance Branch has been organised, and a General Branch of Statistics is in progress of formation. Establishments for the service directorates and their staffs have been prepared, and practically all outstanding questions as regards pay and conditions of service under the new Air Force have been decided. A Works and Buildings Department has been organised, and arrangements have been made whereby the Director-General of Lands for the War Office and the Ministry of Munitions is to perform, and is now performing, similar functions in respect of lands for the Air Ministry.

By February 1st the organisation was sufficiently advanced to enable the Air Ministry to enter into conferences with the War Office and the Admiralty on the subject of the detailed arrangement for the actual transfer of the Royal Naval Air Service and the Royal Flying Corps. It was agreed that the transfer should take place gradually. Hon. members will realise that, important as it is to set up a proper working arrangement here at home, the really vital matter is to secure that there shall be no dislocation of any sort or kind on the front. That is what we have secured. It has entailed an immense amount of work on the officers of the headquarters staff of the Royal Flying Corps and the Royal Naval Air Service, who have had to discharge double duties, but I can say with absolute confidence that on none of the fronts has there been the slightest vestige of dislocation due to this transference. The operations of the Royal Flying Corps and of the Royal Naval Air Service, as indeed the *communiqué's* have shown, have progressed with the same zeal and activity as hitherto. Under the arrangement which has been entered into with the Admiralty and the War Office—and may I say at once that we have received the most cordial and friendly co-operation from both those two great administrations—the full responsibility for new works and buildings has been already taken over, and the full responsibility for the technical air material administration and for movements and posting of individuals in the Royal Naval Air Service and the Royal Flying Corps has also been taken over. I hesitate to prophesy, but, if things go on as they are at present, I hope that early in the next financial year it may be possible to constitute the Air Force at home and to start the machinery going.

The composition of the Air Council has been published. Hon. members perhaps will desire to know the distribution of the duties among the members of the Council. The Council, as will have been noticed, is based upon the experience of the Army Council. It does not follow that will prove in the long run to be the wisest model, but it has this advantage, that the working of the Council and of the arrangements under the Army Council are thoroughly well understood by the vast majority of the officers concerned. The Chief of the Air Staff is charged with advising His Majesty's Government as to the conduct of air operations in all questions of air policy affecting the security of the Empire, including home defence. He is further charged with liaison with the Allies, with the Admiralty, and with the Army Council as regards policy, operations, and intelligence. Under his Department falls the subject of policy as to air organisations and establishments. The principles of training are laid down by him. Schemes of development of the Air Force are also settled by him. Guidance as to the specifications of aircraft, engines, armament, ammunition, and other equipment, strategic and tactical dispositions of air stations, and general schemes for works and aerodromes—that covers, briefly, the sphere assigned to the Chief of the Air Staff. The Master-General of Personnel corresponds generally to the Adjutant-General on the Army Council. He is charged with the duties of raising the personnel of the Air Force, with its maintenance, both in officers and men, with the selection of candidates for commissions, and with the posting of officers and men to the units to which they belong.

Discipline and all legal questions connected therewith fall within his sphere, as well as the arrangements for the Medical and Sanitary Services. The Controller-General of Equipment combines the functions of the Master-General of Ordnance and the Quartermaster-General on the Army Council. He is charged with the supervision of the provision of aircraft, engines, armament, ammunition, and other equipment in accordance with the schemes and guidance as to specifications of the Department of the Chief of the Air Staff, and the arrangements with the Director-General of Aircraft Production for the production of these stores, and for experiment and research to improve the designs and supply of all such equipment. The Director of Lands is charged with taking over, whether by agreement or under the Defence of the Realm powers, all land required by the Ministry, and the management and maintenance from an estate point of view, and subject to the requirements of the Air Service, of all lands taken over, exclusive of any constructional work. All constructional work falls within the province of the Administrator of Works and Buildings. I may say that we have taken over *en bloc* the works and lands held by the Army Council and the Admiralty respectively in connection with the Royal Flying Corps and the Royal Naval Air Service.

The duties of the Parliamentary Under-Secretary of State combine, *mutatis mutandis*, the functions of the Parliamentary Under-Secretary of State for War and the Financial Secretary to the War Office. The duties of the Secretary to the Air Council comprise the general control and co-ordination of Air Ministry procedure and of the conduct of official business in the Air Ministry. Hon. members will probably wish to know what arrangements have been made for securing co-operation and co-ordination with the Admiralty and the War Office. The position is as follows: The Admiralty and the War Office respectively submit their requirements to the Air Ministry for aircraft. The Air Staff examines these requirements and either agrees, disagrees, or modifies, as the case may be, and decides, subject to War Office or Admiralty agreement, I should like to draw attention to this point, because it is quite new and extremely important in securing efficiency in the field. A conference is held weekly to discuss these points between the Staffs of the Admiralty, the War Office, and the Air Ministry, and the question whether a particular air force should be under the Army or the Navy for administration and operations is discussed, and recom-

mendations are made at this meeting. The Air Council also has the power of laying down and recommending to the War Cabinet certain aerial operations, such as bombing, and the best means of carrying out those operations are discussed.

Mr. Billing: May I ask, has the Army Council—

Major Baird: Perhaps the hon. member will allow me. If he attempts to interrupt in his usual way, he is really delaying business. He will have every opportunity of talking. I honestly think the House would prefer me to proceed. I do not mean any discourtesy to the hon. member. The Air Council is prepared to recommend to the War Cabinet certain aerial operations and the best means of carrying out those operations, and obviously recommending where it is most suitable that the operations should be carried out, and whether the Army should carry them out or the Navy should carry them out. The machines are specifically earmarked for these operations, and organised for this work. That is briefly the essential distribution of work among members of the Air Council. Hon. members can ask any questions in amplification as I do not want to detain the House at any length in describing in detail all the arrangements made. I naturally want to give them a general sketch of the arrangements, which will give them an opportunity of raising any point they desire.

The Medical Service of the Air Force is a point to which I ventured to draw special attention when the Bill for the constitution of the Air Force was proceeding through this House. As is well known, a very strong and representative Committee, under Sir W. Cheyne, at the request of the Air Board, drew up a scheme for a Medical Service for the Air Force. Obviously, as with every other arrangement in connection with the amalgamation of a part of the Navy and the Army, it was necessary that the assent of the Army and Navy should be obtained to the adoption of any scheme connected with the change, and though I do not think any objection was felt by the Army or the Navy to the vast majority of the proposals which were submitted by this Committee—it was a very strong Committee indeed which sat under my hon. friend—yet not altogether unnaturally, I think, in view of the heavy drain on the inadequate supply of medical men which is made by the requirements of the countless campaigns we are engaged in carrying on, I fancy the Army felt that the setting up at this moment of a fresh and altogether separate Medical Service might lead to friction and trouble. We have avoided friction and trouble of any kind, whatever people may like to say, either with the Navy or the Army, up to the present; indeed, we have received their co-operation in countless ways. I may safely say that we have come to an arrangement which meets the views of the Navy and the Army, under which it will be possible to carry into effect the system advocated by the Committee presided over by my hon. friend. After all, it is the system which is really of importance. As I ventured to point out to the House when the Air Force Bill was under discussion, the peculiar conditions under which men work in the Air Force, the strain imposed on heart, lungs, ears, nose, and other organs, entails the obligation of a peculiar branch of medical investigation and research. Indeed, it is absolutely indispensable that the medical officers responsible for the care of the officers and men serving in the air should specialise in that particular branch of medical science, and that they should not be shifted and changed indiscriminately from one place to another.

That, I think, we have secured, and we have secured it in this way. It has been agreed by the War Office and the Admiralty, and assented to by the Treasury, that the medical affairs of the Air Force are to be controlled by a Committee responsible to the Air Council. The Committee is to be composed as follows: The Director-General of the Naval Service, the Director-General of the Army Medical Service, the Vice-President of the Air Council, a Medical Administrator of the Air Force, an Assistant Medical Administrator, one neurologist, one physician, one surgeon, one physiologist, and the Secretary of the Medical Research Committee. The Assistant Medical Administrator will act as Secretary. The Administrative Medical Officer will be given the substantive rank of Surgeon-General, and the Assistant Administrative Officer will be given the substantive rank of Lieutenant-Colonel. The Medical Administrator will nominate an executive staff of medical officers and will arrange for the necessary clerical assistance. It will be necessary for the Medical Administrator to have discretion—this is important—to take action on any matter of urgency and on matters of detail which arise in the intervals between the meetings of the Committee. Such action will, of course, be reported to the Committee. As soon as possible the medical arrangements of the Air Force will be centralised under the direction of the Committee. All medical appointments will be made by the President of the Air Council on the nomination of the Committee. Officers who are appointed to the Air Force medical posts will be seconded to that Force. Temporary Air Force Commissions will be given to all gentlemen, whether officers or not, who are appointed to executive medical posts, with the exception of a limited number of officers to be nominated by the Committee for permanent commissions. All medical officers appointed to the Air Force will wear Air Force uniform. Those officers who are seconded from the Army and Navy will receive an assurance in writing that their prospects of promotion by selection in their own services will not be prejudiced thereby. The Administrator of the Medical Service will have direct access to the Secretary of State for the Air Force, and the medical arrangements of the Air Force will be dealt with in the Department of the Master-General of Personnel. So much for the medical arrangements.

The House may desire to know some details as regards the lands branch and the works and buildings branch. As an illustration of the necessity for caution in discussing matters in the House, I should like to mention that with a view to standing well with my right hon. friend the President of the Board of Agriculture, who sometimes makes observations with regard to land taken over for aeroplane stations which he thinks might be devoted to growing corn, I invited my friend the Director-General of Lands, to give me a statement regarding lands which, I thought, might be of interest to the House. I took the precaution of showing that statement to one of the officers of the Air Council, and he said to me: "If I could get a statement like that from Germany, I should be able to tell you exactly the number of squadrons they have in training, and how many men they were likely to have on the front against us this year."

Mr. Billing: Nonsense.

Major Baird: I did not hear the hon. member's remark.

Mr. Billing: I said, "Nonsense!"

Major Baird: I should have thought that was exactly what the hon. member would say. Perhaps he will permit me to attach more importance to the views of the officer who gave me this information than I should to his views.

Mr. Billing: [Hon. members: "Order, order!"] On a point of Order. Having regard to the remark which has been made, surely I am in order in asking the hon. gentleman a question as to whether I misunderstood him in what he wished this House to understand. I should, therefore, like to ask him whether—

Mr. Speaker: The hon. member committed a breach of order by saying "Nonsense!" Major Baird.

Major Baird: I do not want to inflict on the House any more information than it wishes to have. I am only trying to pick out one or two things which may be useful from the very wide range that has to be covered. There is the Advisory Committee on Aeronautics, a very important scientific body, which has rendered important services in the past, and in which the House has shown an interest.

I want to show the House the continuity which we have endeavoured to preserve throughout the organisation which has been built up both by the Navy

and the Army, by the Air Board and outside with a view to securing the greatest possible amount of co-ordination in the construction and administration of the Air Force. The Advisory Committee for Aeronautics was appointed in April, 1909, under the presidency of Lord Rayleigh, "to advise the Government on matters connected with flight, whether of aeroplanes or dirigibles." The Advisory Committee on Aeronautics became in effect an advisory committee to the Air Board, and the expenses incurred in connection with it fell on the Air Board vote. This position remains unchanged since the establishment of the Air Council, and the Committee is under the control of the Council, reporting to the Director-General of Aircraft Production as one of its members. Lord Rayleigh remains the president of the Committee, and its chairman is Sir Richard Glazebrook and its very distinguished membership is constantly changed, that is to say additions are made with a view to keeping them thoroughly up-to-date and in touch with flying conditions. Closely connected with the Advisory Committee on Aeronautics is the Air Inventions Committee. This Committee was established when Lord Trowbridge was President of the Air Board largely at his instigation, and he took a very great interest in this branch of the subject and was largely instrumental in the creation of the Committee. Its function is to unify the functions of the aeronautical sections of the Board of Inventions and Research and the Munitions Inventions Department. The Invention Committee is in form a Sub-Committee of the Committee of Aeronautics from which its members are largely drawn and to which it reports at the same time as to the Air Council. The chairman is Mr. Horace Darwin, and it comprises many other distinguished scientific gentlemen. There is an Engine Sub-Committee, an Aeronautics Sub-Committee, an Armament Bomb Sub-Committee, an Instruments Sub-Committee, and a Procedure Sub-Committee, and, speaking from memory, I think in their last report they said they had examined over 1,100 inventions in the course of last month. The object, of course, is to ensure that inventors shall be given a fair chance. It has this advantage, that it is not composed completely of officials of either branch of the service or of manufacturers or anyone directly concerned in the invention.

A very important change which has been made by the Air Council is the transfer of the control of the Technical Department of the Air Board to the Department of the Director-General of Aircraft Production of the Ministry of Munitions. The proper place of the Technical Department has been the subject of long and earnest consideration, and it is an extremely difficult thing to settle. The object aimed at has been to bring the user and producer into the closest possible contact. It was thought when the second Air Board was formed, and the Technical Department was put under its control in December last, that that arrangement would best meet the object in view. There was reason for thinking that because the heads of both branches of the Air Service and the Controller of Aeronautical Supplies were all members of the Air Board it was thought that a technical department working directly under the Air Board would be in the closest possible touch with the users, represented by the heads of the two services on the one side, and the producers, represented by the Controller of Aeronautical Supplies, on the other side. There is no doubt that that system did secure close touch between the users on the front and the producers, but experience showed that in a supply of so varied and highly technical a character as that furnished by the Aircraft Production Department there were disadvantages in separating supply from design. Under the new system it is hoped to secure the same close touch between the Technical Department and the users of the machines, while doing away with a gap which was found to be inevitable between those responsible for design and those responsible for production so long as the Designs Department and the Supplies Department were not united under the same head.

The use of the experimental stations of the Royal Naval Air Service and the Royal Flying Corps has also been transferred to the Technical Department serving under the Controller-General of Aircraft Production, who also has complete control of the Royal Aircraft Factory. The relations between the Air Ministry and the Ministry of Munitions are, indeed, now technically the same as those between the War Office and the Ministry of Munitions, with the very important difference that the Director-General of Aircraft Production is a member of the Air Council and consequently in close touch not only with the Controller-General of Equipment, who corresponds to the Master-General of Ordnance on the Army Council, but also with the Chief of the Staff and the Secretary of State. The maintenance of the closest possible relations between the producer and user of aircraft is thus assured, and a continuance of this state of affairs is of vital importance. In a branch of supply of the peculiar character with which we have to deal, that is something which has got to be striven after energetically all the time. It would be possible to enormously increase the output of machines probably if you were content to accept large numbers of standardised out-of-date machines, and it would be equally possible to dislocate the whole of your supply arrangements if you are for ever altering your type of machines in deference to certain demands from the front. Obviously, if a machine comes out at the front slightly better than another machine which does its work most efficiently, no one will have anything to say to the old machine and everyone will insist on having the new one. You have to hold the balance between those two views, and we hope that in the arrangement which is now being made, and in virtue of the personal relations which exist between all members of the Council, we have secured that object.

Describing the work of the Air Service at the front, Major Baird said: I do not know whether members take the trouble to add together the number of machines brought down in a month. I should like to take at random the month of September last year. In that month 139 enemy machines were definitely ascertained to have been destroyed by our aeroplanes, 13 others were destroyed by anti-aircraft machine guns and artillery fire, and 122 more were shot down out of control. That is one month alone, and what that means can be left to the imagination of hon. members. These duties are only a part of those which fall to the airmen in modern war. The airmen are the eyes of the infantry, the gunner, and the Staff. Bomb dropping, both by day and night, on aerodromes, railway junctions, billets, batteries, and other military points, has become one of the constant functions of the Air Force essentially connected with military operations. Last September, excluding Italy, 7,886 bombs were dropped on the Western Front, and in the following month 5,113. These are the short-range bomb operations carried out both daily and by night. The weight of bombs dropped was 238 tons. That was in two months. In addition a great deal of useful work is done by attacking troops from the air. In December 123,000 rounds were expended in this manner, and in January 209,000. In addition to firing at troops on the ground, it is the habit of our airmen to descend to incredibly low altitudes to drop a couple of light bombs when they have finished their ammunition. There is another branch of air fighting about which there is perhaps more knowledge in this country, and that is long-range bombing raids. With regard to these, judging by the discrepancy between the reports in German newspapers and the actual facts, the bombed are probably better judges than the bombers, but, in any case, our views and the views of the Government in regard to long-range bombing are well known, and were expressed quite unambiguously by my noble friend the Secretary of State. What people are apt to forget are the number of raids which we have carried out into Germany. We have carried out eleven raids into Germany in rather over two months—that is, since December 1st—while they have only succeeded in carrying out eight raids into Great Britain, and that in spite of the fact that London is a very much more accessible and easily reached target than anything that we can operate against in Germany?

If I do not mention in detail the operations of our airmen overseas—that is, the members of the Royal Naval Air Service—it is solely because secrecy is even more an essential element of this branch of air fighting than perhaps any other. Without disclosing any secret, it may be asserted with confidence that there

is no one the German submarine commander is more anxious to shun than the British seaplane manned by the Royal Naval Air Service. The Commanders-in-Chief, both on the Western Front and in the other theatres of war, have borne eloquent testimony in their official dispatches to the splendid services which have been rendered by the squadrons of the Royal Naval Air Service under their orders. No account of the activities of the Flying Services would be complete which omitted a well-deserved tribute to the pilots employed as instructors. These young officers, as I can testify from personal experience, having myself had the privilege of undergoing a course of instruction, spend hour after hour in the air, day after day imparting their skill to a constant stream of novices, at whose hands they frequently run the greatest possible risks.

Do not let hon. members forget that what has been said about the Western Front applies equally to Mesopotamia, to Egypt, to Macedonia, and to every centre of operations, be it by land or sea, with which we are now engaged. If I have not mentioned any of these other theatres it is because I have already taken up too much time of the House. I have tried briefly to sketch some of the activities of the splendid Service whose interests it is the pleasure of the Air Ministry to watch over. It is a Service whose record already entitles it to the respect and admiration not only of the two great Services from which it springs, but of the Empire as a whole, for every part of the Empire is represented in the Flying Corps. Australia has its own flying squadrons, which have rendered invaluable service at the front, and some of the most efficient officers and men in all branches of both wings of the Flying Corps have their homes in Canada, South Africa, New Zealand, and India. The comradeship of the air has indeed spun one more strand in that invisible but unbreakable thread which unites all citizens of the Empire in advancing civilisation in times of peace and in defending it in war.

Mr. Joynton-Hicks: May I congratulate my hon. and gallant friend on the speech which he has just made. It is a great privilege for any Minister to have been able to introduce the first Air Estimates that have ever been introduced in this House, and we are all much indebted to him for the way in which he has endeavoured to show us what the Air Services are doing. I cannot help feeling that we are still largely in the same stage of transition as we were in when my hon. and gallant friend made his speech on the Second Reading of the Air Bill on November 13th, 1917. In that speech my hon. and gallant friend told us exactly why it was necessary to have this union of the Air Forces under a new Order in Council. He said that while the Air Board supplied the material the Army Council supplied the personnel, and he gave other illustrations where one Department supplied one portion and the other Department another portion. Honestly, I am bound to say that, as far as I can gather, that is more or less the present position, and the Air Forces themselves are looking forward to the time when the hon. and gallant gentleman will be able to announce to the House the issue of Orders in Council consolidating the two forces into one. I want him to use the utmost dispatch to secure the issue of the Orders in Council, so that we may have a real union and so that the Minister for the Air may be the real controlling factor to whom the officers of all ranks in the Royal Flying Corps may look, instead of, as at present, to the War Council or the Board of Admiralty, as their head.

My hon. and gallant friend referred to the Medical Service. Here, again, I should think that between the Air Board and the Army there has been an accumulation of machinery set up which it would be much better to wipe out altogether. Let us have an Order in Council establishing the right of the Air Board to have a special Medical Service of its own, apart from the Army Medical Corps. I do not think I am giving any help to the enemy if I tell the hon. and gallant gentleman that I can take him to a training detachment in this country where there are some 700 or 800 men under training who not only have no medical man attached to them, but whose aerodrome is not even in telephonic communication with a medical man. That, of course, must be put a stop to at the earliest possible moment. It is not right that this should be the case.

The question of the Medical Service leads me to the question of accidents. I do not mean accidents or casualties at the front; they are items in the war which must, of course, be faced, and they are reduced to the lowest possible minimum. I am referring, however, to casualties at home in training. I want to ask my hon. and gallant friend to overhaul the system of training. I have the honour of acting on a Committee dealing with the subject of aerodromes, and I therefore know something of the question. I have one other smaller question. We have chaplains in the Army and in the Navy, and I am quite sure one of the first things my hon. friend will do as soon as he can will be to establish a Chaplains' Service also in connection with the Royal Flying Corps.

The real question upon which the whole secret of success in the Air Services depends is the question of production of efficient aeroplanes and aeroplane engines. I have urged and urged again that the Air Services should look ahead year by year, and should not merely be content with catching up with the enemy, but should go one better, and, instead of making a 250 h.p. engine to compete with the German, they should go for a 300 or 500 h.p. engine. Production has, of course, increased enormously since we discussed this matter in the House a year ago, but although I will not give the figures, I do not think I can give information to the enemy if I say that production has not come up to the figures of the estimated engine production given to this House by the Prime Minister in July of last year. I want to concur with my hon. and gallant friend also in what he said in regard to the technical departments transferred to the Ministry of Munitions, but on another point I hardly can concur. He said the people at the front were constantly altering machines, and asking for the alterations to be included. I think it is exactly the opposite.

Major Baird: I do not want to misrepresent the people at the front. What I said was that the danger was that people at the front who saw a new machine might want to discard their old machines, and might want to be supplied at once with new ones. I do not say that is the fact, but that it is a danger which has to be guarded against.

Mr. Joynton-Hicks: With regard to completely new machines, I am in entire sympathy with my hon. and gallant friend. What I want to guard against is the constant tinkering alterations in the hope of getting small benefits and increases of speed on existing machines. The one message that I was given to bring back from the front recently, from the highest to the lowest in the Services, was, "For God's sake, tell them not to be always tinkering and trying to improve our machines. If you can give us a new one with an advance of 15 or 20 miles an hour let us have it; but do not try to improve our existing machines by an increase of a mile or two an hour." That is the fault of the Designing Department, and I rather want my hon. and gallant friend to put his heel a little on the Designing Department, and to try to prevent them making these constant alterations, which delay production more than anything else in the world. I want my hon. and gallant friend to reduce the number of engines. It is no benefit to the enemy if I tell this House that at the end of last year there were actually being delivered, under contract, 28 different types of engines to our Air Services, without mentioning experimental engines, which were also being constructed. Twenty-eight different types of engines, involving 28 different sets of spare parts! Whenever I ask for standardisation I am told that that prevents new improvements; but it has not done so in Germany. Germany uses at the outside five or six types of engines. Let us use, then, eight or ten types, which would be ample, instead of the 28 different types being delivered at the end of last year.

Then I want a further output of engines. I want my hon. and gallant friend to tell the House, if he will, that he is or he is not satisfied with the arrangements made by the Ministry of Munitions with regard to the output of aeroplane engines. I think my hon. and gallant friend will have to make a demand from

the War Cabinet, or from the Ministry of Munitions, for the allocation from some other branch of munitions work of a definitely increased number of men for the construction of aeroplane engines. It is no good going on with our present factories. We must increase them, if necessary double them, and for that purpose he will have to go to the War Cabinet and say that this is really more important now than some other branch of munitions. I do earnestly ask my hon. and gallant friend to give his counsel in this direction, to take this matter in hand, and to make a concrete proposition to the War Cabinet, if necessary, for the diminution of the output of some other munitions, in order that this absolutely vital matter may be taken in hand, and that thousands more men may be put to work on aeroplane engines.

I meant to say something as to the efforts our American friends are making, and it is rather curious that they do not feel any difficulty in giving some of the figures. They appear to have no Token Votes in the American House of Commons as we have here. I do not know why we should not have heard how much we were spending and the efforts we were making in regard to aeroplanes and air engines. Our American friends have published the fact that they propose to have several hundred thousand fitters and mechanics, and that many observers are being trained in the States, Canada, here, in Egypt, Italy, and in France. Those are public statements published in America, and they admit in their published statements that their aeroplane turn-out may be somewhat late. I do not know whether my hon. and gallant friend has studied the American papers, but it is stated there—and this is a matter for us to take note of—that the aeroplane turn-out may be two months late on the period they estimated for. It is very interesting to see that they really mean very definite work in this direction, and that the first appropriation of money made by the United States Congress for this matter was for \$640,000,000. That is a very large sum for a first appropriation with regard to the provision of aeroplanes, and when one remembers that in America only a year ago, when they first came into the war, there was only one factory making aeroplanes, and those only training machines, that they had not a single factory making war machines, and that they had only 75 officers in their Air Corps, whereas to-day in the Equipment Department alone, after eleven months of war, they have over 400 men and 1,000 civilians working in order to turn out their share and quota of aeroplanes and aeroplane engines, some idea can be gathered of what the American effort means. I wonder whether my hon. and gallant friend would mind telling us, if he is going to reply, the position with regard to linen. The Americans are dealing very industriously with that branch of the question.

The Ministry of Munitions and the Board of Agriculture should be stirred up to grow more flax. There is bound to be a shortage of flax. Our American friends have noticed that, and they are dealing with the matter. I do not know that I can ask him to go the length to which our American friends have gone, and to grow the castor oil beans in order to provide oil for the lubrication of the best engines. To show the thoroughness with which they are doing their part, I need only mention that they have sent to Bombay for these castor oil beans in order to grow the oil, so that when the time comes they shall not be short of this very necessary commodity. That shows that our friends over the water are going to do their best. But we must not rely upon them. Our primary reliance must be upon ourselves.

I come to my final question, that of reprisals. London must be defended and is being defended very much better than it was. But I may remind my hon. friend that when we dealt with the defence of London we were told, I think, by the Prime Minister, that we should have to submit to a possible invasion in the air and stand it, that it was impossible to bring machines from the front to defend London.

The invasion of London by Germany has a definite military object, and that military object is the retention here of a large number of machines, guns and aeroplanes which otherwise might be used at the front. Does it not occur to my hon. friend that, if we were to make the same attacks on the Rhine that the Germans make on London, Germany would have to keep machines, men and guns there, not on one spot, but along the whole of the Rhine? I do not know the population of Treves and Thionville, but I believe that it is something like from 50,000 to 70,000. But I am not satisfied with the bombing of these small towns. I do not think it will have the psychological effect upon the people of Germany which a real, definite bombing raid upon Frankfurt, Cologne, Essen, Dusseldorf, or some of the large manufacturing towns on the Rhine, would have. If we could only go over a portion of Cologne and bomb it thoroughly it would have a vast effect.

I am going to ask my hon. and gallant friend to put these matters before the Air Council and to lay down a definite programme. It is too late, of course, for the summer offensive of this year, but if the war is to go on next year it is not a moment too soon to do it now.

Mr. Harcourt: I desire to confine myself to one particular point. The War Office, at a cost of about £500,000, made a little home and presented it as a marriage settlement gift to these young people, naval and military, who have been joined in what I hope is harmonious matrimony under the auspices of my hon. and gallant friend and his advisers at the Air Board. In regard to this aerodrome, one would expect on the part of this young couple becoming gratitude towards a rich relative for this handsome establishment in life. But, amazing to say, not merely do they omit to thank the fairy godmother, but they actually reject the proffered gift. On what principle have they abandoned that aerodrome? There is no apparent reason, but what is apparent, and not denied, is that there has been mess and muddle, hesitancy and waste. If we are here for one purpose more than another, we are here to see that there is no sloppiness in the spending of other people's money. This is a House of Commons case, and I trust they will press it to a finish.

Sir Watson Rutherford drew attention to the refusal of the Treasury to sanction the proposed new issue of capital in connection with Whitehead Aircraft, Ltd., and appealed to the Government to allow no impediment to stand in the way of giving all facilities to concerns willing and competent to turn out machines which can be made use of in the war.

Sir Watson Cheyne, dealing with the work of the Special Committee set up by the late Air Board, said: The problem that we had to deal with was, of course, that of the accidents which occur in air work, and the question as to how far medical science could avert these accidents. When aviation first commenced all the accidents were attributed to faulty machines, but now we find that the factor with which we have to deal is not the flying machine but the human machine, and so it makes the medical question an exceedingly important one. Let me tell you something about the medical aspects of aviation. The human being is constructed to live upon the earth; he is not constructed to live under water or up in the air, and all his mechanisms are delicately knitted together for living under those conditions. The two chief conditions which concern us, so far as we know at present, are the atmospheric pressure and the density of the air—the density of the air especially, because with a suitable density of the air there is the amount of oxygen available, and without oxygen we cannot live. The actual degree of atmospheric pressure and the density of the air may vary under ordinary circumstances within considerable limits. People may live on the sea level or 5,000 or 6,000 ft. above the sea level, and you can go from one to the other without great discomfort if you do not go too quickly, but take a little time in transit. The human mechanisms can then accommodate themselves, but of course there comes a limit. In climbing a mountain 10,000 ft. high you take a day or two to do it, and in that time there is a certain amount of accommodation, and as, I suppose, all mountaineers know, people get sometimes mountain sickness or mountain faintness, and many people are very glad to come down.

But the conditions in aviation are quite different. You go up 10,000 ft. in

a few minutes, and the human mechanism has not time to adapt itself, especially if you go still higher. After the aviator has mounted some distance he comes into air which does not contain so much oxygen as is necessary. He does not take in enough oxygen in one breath to meet the demands of the body, with the result that he begins to breathe faster. That does not suffice and the heart beats quicker to enable more oxygen to be taken in, and so you have a vicious circle established, until the aviator gets to a considerable height, when the heart begins to fail; he begins to lose consciousness; he may actually faint, and, although that is not always fatal, because in these modern machines there is a considerable amount of steadiness, I am afraid a good many people never recover from that faintness, or, if they do, they find they are dashing to their doom. Nowadays, of course, aviators are provided with oxygen for inhalation when they find it necessary to employ it. Aviators differ very much in the heights they can go without the supply of oxygen. The heart and lungs are not the only things concerned. Almost more important is the nervous system. On the earth it is customary to take things quietly. The nervous system is not subjected to sudden and violent shocks, but up in the air the nervous system is acting, quite unconsciously to the individual, of course, under great strain. The man is on a non-stable foundation instead of a stable foundation. The nervous mechanism is acting under great strain in maintaining the equilibrium of the aviator, and is acting under great strain in many other ways. I do not know that any aviators are consciously frightened, but their nervous system is frightened, if you understand what I mean. Although the aviator is not having any feeling of fear, the brain is conscious of the dangers surrounding him, and is getting exhausted in its efforts to overcome those dangers, and where the exhaustion comes specially in is in a rapid descent from a high altitude.

Another important thing is the necessity of having true binocular vision, especially when travelling at a great speed, and of having a very rapid connection between the sight and the action; in fact, in selecting pilots, one of the most important points to ascertain is whether the binocular vision is good, and also the time it takes between the aviator seeing and taking action. Very often it has been discovered that one eye is not used at all. Many people are going about with one eye and are not using the binocular vision; that is an extremely dangerous thing. You could not allow a man to enter the Air Service unless you found he had proper binocular vision; otherwise he would kill himself and smash his machine. Those are the chief troubles; but what I am speaking about relates to high altitudes—10,000 ft. and over. The troubles of low flying are not nearly so marked.

The question arises, How are you going to avoid these dangers? And I should say that it is the trained man who runs greater risk than the man in training, because he goes to much higher levels. There are various ways in which you may deal with the subject. It is only in the last year or two that the study of the subject has commenced, but it is remarkable how much work has been already done. The Air Ministry have had people working for them for a couple of years, I believe. For research the first thing is to find out the cause of all these troubles—the exact cause. I have only mentioned very roughly some of the things, but they must be investigated in order to find out in what way they are likely to be remedied. For such research you want eminent men. You want physiologists of high standing and you want physicians. But you do not only want men who work in laboratories; they have to get in touch with actual aviators and learn by statistics and observation what happens to them. For this purpose the investigators need a set of trained doctors actually in contact with the aviators to furnish the statistics and observations on which they build up the theories. That is the first thing you have got to do in considering the Air Service.

The next thing chiefly concerns the prevention of those accidents, and, of course, the first form of prevention is to keep out pilots who are likely to be subject to those troubles—for instance, men who have not proper binocular vision, men whose heart and lungs do not allow them to go to great heights, and men in whose case the movement between sight and action is slow. One way to test that is to have a revolving drum with a light in the middle which comes out at one point. The man holds the needle and the moment he sees the light he has to move the lever. If it takes one-fifth of a second between the time he sees the light and the mark in the lever, he is no good for flying. There are all sorts of other ways of testing at the present time. The skilled man can ascertain to what height an aviator may go safely and to what height he may go with oxygen, and in that way also a great deal can be done to prevent accidents by not allowing men who are not suitable to become pilots. Here, again, you need skill and special medical officers to make this examination. This question of air medicine has not yet got into the schools. It is not taught. You cannot blame anybody for that. It is quite a new thing, and there are only a few men who are working at it as yet. There are really very few men who are engaged in regulating the admission of pilots who are doing this particular work. That is one point in the way of avoiding these accidents.

The other point in the way of avoiding them is, that the medical man must be in daily touch with those with whom he is dealing, in constant association with the aviator. There is a cumulative effect of high flying on the aviator. A man goes up the first day and he comes down again and perhaps he is a little elated. The next day, and perhaps for three or four days, much the same will happen, but then he begins to find that he is not quite up to the mark. He also begins to find, or other people find for him, that his observations are not quite so accurate. In other words, the aviator is getting stale. That is a very important point in connection with flying, and the real function of the medical man attached to an aerodrome, with a view to looking after the flying men, is to watch this point and see to the safety of his charges, because it may be that the man is sent up and he comes down with a crash and gets killed.

We want doctors who love the airmen and the Air Service, who will keep an eye on them, and who does not drive the airman away by fussing about him; a medical man who forms his own opinion for himself and probably meets the man when he comes down from the air after a flight and in a general way gets him into condition to be ready at any moment. He should be about when men are being selected for special flights, to see that the men are in a fit condition to go up, and if they are not to tell the commander that he must take somebody else. In fact, a medical man of the Air Service ought to stand in much the same relation to the men as an athletic trainer to those whom he trains. That man likes to keep his team absolutely in training, and the Air Force in this respect needs very careful doctoring, and needs a better class of doctoring than either the Army or the Navy. The thing is a new idea, a new conception, a novelty. There are also what may be termed air diseases.

Let me draw the conclusions that ought to be drawn from these points. The first conclusion is that the study of the special ailments and disabilities of flying men is as much a special subject of ophthalmology, bacteriology, &c. This has been abundantly demonstrated by experience. It follows as a corollary to the above that no medical man can reasonably expect to become efficient in the study and treatment of these disabilities unless he is prepared to devote the whole of his time and energy to the subject; and no medical man will be prepared to do this, unless he can be reasonably assured of the opportunity permanently to pursue his studies and put them into practice. By no other means is it to be expected that justice can be done to the flying man.

These are the arguments which convinced me that a special Medical Service is absolutely necessary, and the Flying Officers' Medical Committee came unanimously to the same conclusion. Further, it would be very illogical not to have a special Air Medical Service. You have a special Medical Service for the Navy and for the Army. You have a special Indian Medical Service. You have a special Police Medical Service; a special Post Office Medical Service, and also special Medical Services for the Home Office, the Local Government Service, in

connection with the Education authorities; in fact, every Government Department has its own Medical Service except the Air Service.

It is not a very easy matter to institute such special medical air service at the present time, because the Army and the Navy, between them, have taken all the doctors, and the question arises how on earth we are to get doctors for this proposed new service. The idea of those associated with me was that as the Army and the Navy between them apportioned off a certain number of doctors to the aerodromes to attend to the flying men that we ought to take over the whole of that Medical Service in England, and thus get the doctors which the Army and the Navy are at present supplying for this work as a nucleus of a larger and more satisfactory service. I do not think we should require such a great many doctors for this new Service at the present moment, but it is a growing concern, and as time goes on we should, of course, require more.

Another question which has been raised is in regard to the expense. I do not know what the cost will be. I know that something was said the other day about an aerodrome which cost £500,000, and which was abandoned. That would have paid for the Medical Air Service. As a matter of fact, two or three hours of Government expenditure would be sufficient to pay for the Medical Air Service.

Let me take another point. What is the value of an efficient aviator? I am told that he costs the country about £900 and his machine roughly costs about £4,000. If an aviator is killed and his machine is wrecked roughly you lose about £5,000. I do not like to make such a calculation, because it is putting money value on a man's life, but I only mention it as an illustration. Let us consider how many of those lives and machines could be saved in the course of a year. Let us place the number at one hundred, and if you place the cost at £5,000 then you save half a million of money and you pay for the expense of the whole of the Medical Air Service. I do not, however, think that the question of expense is anything to do with the matter.

Then there is an idea that after the war we are going to have an Imperial Medical Service and the doctors are to be told off to different branches of the Service. I fancy also that there will be an attempt at interchange of the doctors, and a medical man will be an air doctor for a time and then he will probably be sent to some other Service. That does not help us as it is not being started at the present time.

With regard to what has been arranged for the Air Service, the length of time which was taken in coming to a decision did not suit my mind at all. I like to make up my mind quickly and stick to it. You have heard what is the present state of things, and in future the Air Service is to be in commission as it were under the Army and Navy. There is to be a Chairman of the Board, the Director of Naval Medical Service, and the next man is to be the Director of the Army Medical Service, and the gentleman who represents the Air Service is to be a medical administrator.

In that arrangement you have no permanence. Men are to be seconded, say from the Navy, for three years and then they go back. That is not a proper medical service. The Air Service will, however, be allowed to have a few officers with permanent rank. I was very worried over this matter all the winter, and I went to my hon. and gallant friend and said, "I am going to move the adjournment of the House in order to bring the question of the Air Service before the House of Commons." I really was in earnest, because the thing could not go on any longer. That resulted in my being shown what the compromise on this matter was. I studied it and slept over it, and then I came to the conclusion that I should not be justified in rejecting this compromise. Supposing we had said, "This compromise will not do." It would have taken two or three months before we should have got any further, and in the interval no medical man would have been in training. Therefore, I thought it was far better to accept this compromise, although I know some of the members of the Air Council were very keen about a special Service; this was all they could succeed in getting for the time being. I concluded that it was much better to take this compromise in the meantime, although I do not think it will work or meet the requirements of the Air Service. If, however, you get plenty of medical officers trained, that is the main essential, and it does not matter much about the administration. After the war you must certainly have a separate Medical Air Service. The Air Service is not going to be demobilised, but it is going to be one of our great national assets, and people who travel in aircraft will insist that the pilots are certified to be thoroughly fit by specially-trained medical officers.

Colonel Sir Hamar Greenwood: It is a positive scandal that this scientific department of the Air Service has not got a scientific medical board perfectly free from the Royal Army Medical Corps. That corps has done yeoman service during the war, but the most enthusiastic supporter of it would not presume that it has within its members anything approaching the great knowledge of specialists like the Committee which was set up to advise the Board, and who unanimously advised the creation of a separate Medical Air Service.

The suggestion underlying everything said by the distinguished medical gentleman who has just sat down is that at this moment we are sending these gallant boys—the great majority of them are mere boys—to fight Germans in the air without them being properly examined by skilled medical specialists before they make their ascents. It is a cruel thing.

I cannot but emphatically protest against the action taken by the Air Ministry in turning down this Medical Advisory Committee's Report and in refusing to disclose to the House—I myself have asked for it several times—the Report itself, so that we might form some opinion as to whether it should be carried into effect, or whether we should be governed in this, the latest scientific development of warfare, by the Royal Army Medical Corps, which has not produced one single atom of evidence to justify its control of this in some respects our most efficient service. I want to ask the hon. and gallant gentleman in charge of the Estimates if it is a fact that during the year 1917 we lost more flying men in schools of instruction than we did on all the fronts? Of course, one does not ask for numbers, but I would like a specific answer on that point. There is nothing more cruel in this war than to have a man lost during his training. The Air Service is the only Service where the casualties in training are other than negligible. I appeal to the Under-Secretary to give us some hope that in the immediate future the sad casualty list in the training schools will be diminished, and that the Air Ministry is not bogging over money or worrying about the rights of farmers or the positions of haystacks.

I am glad to think that here in England we produce the finest engine of any flying machine, in spite of what one may read, but we have not enough of them. It is a commentary on this and the two preceding Governments that in the fourth year of the war we are actually short of machines, and that we have men trained to fly who have not got machines with which to fly. We have got a great number of machines. We have got various kinds of engines.

I would urge the Government to get this engine business on a proper basis as quickly as possible, so that the supply of engines will not only be large, but will be enormous.

Colonel C. Lowther: In spite of the sanguine speech of the Under-Secretary, it is an open secret that the defences of London, notwithstanding improvements, are very inefficient and very inadequate.

I am pleased that the system of reprisals has been accepted by the Government. For months, almost for years, I among other members advocated the system of reprisals, only to be put off with some evasive answer or to be told that it was contrary to humanity, or that it was impracticable or something of that sort. I hope that now the system has really been adopted, there will be no cheap sentiment about wholeheartedly advocating reprisals and taking them up. May I make one suggestion to the Parliamentary Secretary? It is that for every attack made upon London, or upon any unfortified city, we should immediately make a counter-attack upon Frankfurt or Cologne or Dusseldorf, or some

big German town worthy of making an attack upon, by which I mean a town of over 200,000 inhabitants. In addition to that, could we not notify to the inhabitants of that town, either by dropping leaflets or in some other manner, that the attack is made in answer to a specific attack upon London or some other unfortified town in England?

Sir J. Walton raised the question of the aerial gunnery station in Scotland, and asked on whose advice the scheme was abandoned and on what ground, and also if the Under-Secretary could state what further expenditure would yet have to be made to finally close this most important transaction?

Colonel Sir C. Seely supported Mr. Joynson-Hicks and Colonel Sir H. Greenwood as to the very great desirability of the Air Ministry taking note of the very serious number of accidents which occur during the course of training in England.

He also asked what effect the institution of the Versailles Council would have upon the Air Council, to what extent their executive powers will apply to his Board, and what authority, if any, it will have to make demands upon him for personnel and for material irrespective of other demands for our own services? He would be glad to know to what extent it will apply if it applies to all.

continued: The hon. and gallant gentleman mentioned the fact that the aeroplane was the one thing of which the submarine was really frightened. I hope we may trust that in the provision of aeroplanes and in the division of the duties of aeroplanes he will not forget that fact and will not forget that really the most important thing at present is to deal with the submarine menace. Reference has been made to the question of raids and reprisals. I do not like the word "reprisals," and I do not like the principle of reprisals. I do not think two wrongs make a right. If you really want to produce a moral effect upon the German, the real way to do it is by destroying submarines. If by means of a sufficient provision of aeroplanes you could ensure that any submarine within ten miles of these shores was discovered and sunk within a day or two, you would produce a moral effect upon the Germans enormously greater and out of all proportion to what you would do by dropping any number of bombs upon the civilian population anywhere in Germany. I feel that the demands of the Navy, whatever they are, for the purpose of protection against submarines should have absolute preference over almost every other purpose in the provision of aeroplanes, and I trust we may feel confident that that principle is well noticed and improved on by his Board.

Mr. Lynch: There is one point on which I would beg to differ from my hon. and gallant friend, and that is where he rather limited the number of new elements which come into play. I refer, for instance, to sudden shock and sudden surprise, quite apart from the actual physical effects of the elements in which the pilot is flying. There, again, the French have endeavoured to ascertain beforehand the aptitude of their pilots by an ingenious adaptation of means which were employed in quite another sphere of science, namely, experimental psychology. They have adapted or devised delicate instruments for testing the speed of reactions, and also the nature of reactions to sudden shocks! I would like to ask the representative of the Air Ministry if there is anything in this country corresponding to these laboratory tests which have been set up by the French, which, at first tentatively, and now with every increasing knowledge, they have developed so as to give increasingly valuable tests? I hope that the Air Council will resolve to give an entirely separate Medical Service for the Air Service. The hon. and gallant gentleman pointed out the difficulties of obtaining the necessary medical men; he said that the Military Service and the Naval Service had already secured all the available medical officers. The significance of that is, and this was what I foresaw when the Bill was passing through Parliament, that the same principle operates not only in the Medical Service, but right throughout the entire functions of the Air Service; and it is precisely that which is limiting its usefulness so far that, instead of being a great striking force, which might have been decisive in its results, it has already of necessity been whittled down until now it is little more than an adjunct of the Military and Naval Services.

As a representative of Ireland, I will mention the neglect of the development of the Air Service in Ireland. This should not be a difficult problem at all. In Ireland you have all the facilities for producing a great aeroplane output. You have the land and you have the labour available, and it would be a benefit to Ireland and a great benefit to the whole country. That ground has been almost entirely neglected. I would like to have a clear and definite reply to the question why that is so. There is an idea of some want of good faith in dealing with the Irish representatives, and I would like to see that notion dispelled, because it may be entirely unjustified. At any rate, I would like to see this question definitely faced once and for all. Why do you neglect that promising ground, which, if properly cultivated, would so enormously increase your aeroplane output?

Our one great avenue to victory is by the air. It is possible to obtain that victory by the air. Whatever difficulties may be interposed those difficulties are capable of solution. Therefore, the Government must even now, at this late hour, rise out of those traditional grooves and regard this matter in its true light, plant that problem steadily before their eyes day by day, that what we want is not a mere adjunct to the Army and Navy, but a great, a colossal, and, I hope, a decisive new striking force on which we can all confidently build our hopes of victory.

Mr. Billing: First of all, I take exception to the fact that these Estimates are introduced on a Token Vote. What is the use of coming down to the House of Commons with a Token Vote of £1,000? What does that convey to us? I suggest the Estimates would have been better introduced had we had the amount which was proposed to expend on the Air Service announced to us here to-day. Is it £1,000,000, or is it £10,000,000? I do not think any hon. member, if he gives this matter thought, would suggest that by coming to this House and stating that it is proposed to spend 10, 20, or 50 or a 100 millions—and I hold, and I am glad to say that gradually other members of this House are beginning to hold, the opinion that if £100,000,000 were spent on the Air Service it would be well spent—on the Air Service, that £50,000,000 was to be spent in training great raiding squadrons to carry our war into Germany, that would not have been a more satisfactory statement than coming here with a paltry Token Vote of £1,000 and wasting the time of the House with a dissertation on what airmen do? I am quite sure the pilots to-day would far sooner hear what we were going to do for them than a long dissertation on what they are doing for us.

When the Air Force Bill was before this House I opposed many of its points to the full extent of which I was capable, but I am glad to say that though they gave themselves in the Bill powers to commit administrative blunders they have decided not to commit them. They have decided that the Naval Air Service, that is, the part of our air fleet which is essential to the well-being of the Grand Fleet, should remain under the command of the Grand Fleet, and that the part which is essential to the well-being of the Army in the field should remain under the command of the Army in the field, and they wish to build up a separate Air Force for the purpose of striking behind the enemy's lines. That is well. I only hope that the other point which arose at that time will be settled in the same spirit. Yet, despite that, we find that a very considerable difference of opinion seems to exist as to the value of a striking and air-raiding force into Germany. I am not going to enter into a dissertation on the regret experienced in regard to past action. What was said then was only in the nature of a prophecy: to-day it is in the nature of an actual fact.

I put it to the Government that the time has come when it is possible to standardise three distinct types of machines which are necessary for our efficiency and for our success. The time has also come when it is possible to standardise

the three types of pilots. There are three distinct jobs for pilots. The first job, which calls for the least skill, is night bombing. The man has simply to be able to box a compass and read his instrument, and it is the simplest thing to teach him to fly as a night-flying bomber. Out of every 100 men you get you would probably find at least 60 of them capable of learning to fly night-bombing machines. Then there is the question of the day-bombing machines. One of these machines requires a man of greater skill and of a totally different type of courage. The night flyer deals with an unknown danger, the day-bomber deals with a known danger, an apparent danger, and this is where our Medical Service can help us so much. In the case of the night-flying bomber who deals with an unknown danger, his nerves might possibly be affected if he were called upon to face a known danger.

We have the fact that we have three types of pilots, and we come to the other interesting fact that there are but four types of machines which it is necessary to standardise.

Captain Sheehan: I want to draw attention to the question of national aeroplane work in Ireland. I think that in regard to the Air Services and Industries of Ireland, practically from the start of this war, Ireland has not been treated fairly or equitably. Several millions have been added to the taxation of Ireland, and what has been given back to that country in the way of war employment is only a drop in the ocean as compared with the taxation which has been put upon us. That is not quite fair, and those of us who gave our services in the war, and who induced our countrymen to assist in it, have a right to demand that fairer treatment should be given to the country which we represent.

I would ask the new Air Ministry to use its influence to see that Ireland is not entirely neglected in the matter of its activities. There is no doubt that you get many of your most gallant officers from amongst my own fellow countrymen. I have a very personal interest in the matter, because one of my own sons is serving in the Air Force at the present time. Having given our services, the least that we have a right to demand is that we shall have some consideration in the matter of aircraft manufacture.

Mr. T. Davies and Major D. Davies both urged that full attention should be given by the Air Council to the medical question.

Major Baird: May I thank hon. members for the reception they have given to the first Vote for the Air Ministry? There have been in the main three points raised in the Debate. Let me take, first, those raised by Mr. Joynton-Hicks. He complained that the transition stage was rather prolonged. He had hoped to see the Air Force established before now. I can assure him that there has been no undue delay. Let him realise that we have to deal with two Services, serving under two different discipline codes, with great traditions, different ranks, different rates of pay and engaged in daily, hourly, nightly service against the enemy, and it is impossible to merge those two forces without an immense amount of the most careful work, so as to ensure that, whatever else may occur, when the fusion takes place, there shall be no confusion and no dislocation on the front. If my hon. friend will bear that point in mind he will not think the time has been excessive. Then, in making this fusion, he has, first, to settle all kinds of disciplinary and financial matters with the legal authorities and the Treasury. We have then to lay down the new system, and in a perfectly clear, straightforward manner, to see to it that a pamphlet containing the regulations for working the new force will be in the hands of the officers concerned a reasonable time before the force comes into existence. We have now got a proof of the pamphlet, which will be distributed at a very early date throughout the whole world where officers and men of the Royal Flying Corps and the Royal Naval Air Service are now stationed, so that when the change takes place they will be aware of the position. The Act contains a Clause which gives an officer or man the option of reverting to his old Service during a period of three months, starting from the time when he receives notice that he has been transferred to the Air Service. No harm has really been done. I described how we are taking over, gradually, different branches of the Air Service. We have already taken over works, buildings, and land, the posting of individuals, and a few other points which are all coming over gradually, and it is only by a process of gradual change that it is possible to carry out the transfer without confusion or dislocation. There is, of course, the other point of housing. We cannot exchange the men who are necessary for running the joint Air Force until we have more room. All these are details of a more or less domestic character, but they are of vital importance in dealing with the efficiency of this new Service.

A point of greater importance, perhaps, which formed the subject of the most interesting speech, which we were all delighted to listen to from my hon. friend (Sir W. Cheyne), is the question of the medical services. The hon. and gallant gentleman (Major Davies) made a more or less determined onslaught on what he called the Air Board. I think he means the Air Council. The Air Board is dead, and the Air Council has taken its place. I hope hon. members will not confuse the two things. In supporting the arrangement which has been come to with regard to the Medical Service I am in the extraordinary good company of Sir W. Cheyne. In regard to medical matters I would plump for my hon. friend (Sir Watson Cheyne) every time, and he and I agree absolutely. We are both agreed. He presided over a most distinguished Committee which presented a Report to the Air Board. The Air Board accepted this Report, and it formed the policy of the Air Board with regard to the Medical Service under the new organisation. That was the Air Board's contribution to the discussion between the Army Council, the Admiralty, and the Air Board before the formation of the Air Force. The Air Board were only one of the three parties to the discussion, but the other parties to the discussion having possession, which is nine-tenths of the law, were in a considerably stronger position than we were, and it proved impossible to persuade the other parties to the discussion to accept the proposals of this Committee.

We came to an agreement whereby it becomes a point of honour for the Navy, the Army, and the Air Council to see that this new Air Medical Service is efficient. The main point is that you should have a body of medical men specially trained to deal with that particular medical aspect of cases which only occurs in people who live in the higher atmospheres and who live the life of airmen. I hope that hon. members will, at any rate, be as generous in this respect as they have been in other matters connected with the Air Service, and that they will give this new scheme a fair trial and give it a fair chance of showing whether it succeeds. It is only for the duration of the war. After the war it must be obvious that a separate Medical Service for the Air Service is bound to come. To insist on our starting a separate Medical Service now would only mean that there would be no Medical Service at all, while the fight is in progress, and thousands of lives might be lost which might have been saved by the adoption of a system which, at any rate, is a great improvement on anything which has been done before. It must be remembered that we do obtain control by the Air Council over the Medical Service under the new system.

At the request of the Director-General of Military Aeronautics, military medical authorities have been working on special lines in regard to the Royal Flying Corps. The officers are now examined by a special medical board before they are sent for training in France. Another staff is engaged in the medical examination of officers suffering from disabilities caused by flying. A special type of hospital has been set apart for the treatment of members of the Flying Force, both military and naval, and in addition a Royal Flying Corps hospital, which is maintained entirely by private subscription, provides accommodation for 70 serious cases and more than a hundred convalescent cases. This has been at work for more than two years, and we owe a deep debt of gratitude to those who have organised it. Meanwhile every effort is being made to give special training for medical men so as to qualify them to discharge the peculiar functions which are necessary.

We are incurring considerable displeasure on the part of those responsible for collecting air pilots because of the rigorous nature of the examination which is insisted upon. It cuts both ways. The young men complain that they have to come all the way from Edinburgh or Dublin to be examined here in London by a special board. But that is justified solely on the ground that it is impossible at the present time to establish boards of specially qualified men at different centres, and it has been thought it would be far better, under the circumstances, to have the examination in London rather than to incur the risk of accepting men not quite up to the proper standard. Now I come to the question of Loch Doune.

I may explain what happened from the point of view of the old Air Board. In 1916 the French had a school of gunnery which enabled them to give a particular kind of instruction in gunnery and which led to an immense increase in the efficiency of their Air Service. That school was visited by representatives of the Royal Flying Corps, and in order to reproduce the same course of instruction as was given by the French it was thought desirable that we should obtain if possible a similar area of ground with a large expanse of water here. The whole country was searched for a suitable site. Many places were examined. Their advantages and disadvantages were balanced, and the conclusion was reached that Loch Doune offered the best prospect of success for such an institution. The technical experts of the War Office had doubts as to the feasibility of making the school, but the Flying Service held that Loch Doune was the best place provided that the difficulties were not insuperable, and nobody, I think, will deny that, if we were to have some place where the same course of training could be given to our airmen as the French were giving, Loch Doune appeared to be very suitable for the purpose. Works were commenced, but they proved to be far more difficult and far more costly than was originally anticipated. Up to this point I had no responsibility, but here my responsibility does come in, and if hon. members are looking for a scapegoat they can start with me, because I am prepared to accept responsibility for abandoning Loch Doune, and I will tell the hon. members why that course was adopted. When the Air Council took over the buildings and undertakings of the Royal Flying Corps and the Naval Air Service we wanted to know what it was we were taking over. We found that amongst other things Loch Doune was included, and an officer of the Air Council went down to look at it. On his report we came to the conclusion that, from the point of view of the works which had to be carried out, there was no hope of completing those works during a reasonable period of time. Further than that, it was costing a much larger sum of money than was contemplated when the undertaking was set on foot, and we said—and I am prepared to stand by it—"We will apply to this public business the principles which we apply to our own private businesses, and we will cut the loss."

Nobody will deny that the place could be made into an aerodrome, but it would take too long and cost too much to justify that being done now. That is the whole story. Will hon. members please believe that there is not any body of men on earth more anxious to reduce casualties to the lowest possible limit than those responsible for the Air Services? It is not easy to say to what casualties are really to be ascribed. A very large proportion of casualties, no doubt, are due to errors of judgment, but if in time of war you try to establish different categories of casualties—fatal accidents, I mean—and to say that if there had been more medical examinations there would have been fewer casualties, or that if there had been different machines there would have been fewer casualties, is, I think, not to do anything in which there is any advantage. It is not an unnatural thing for hon. members to do, I agree, because there is nothing, obviously, that appeals more to the feelings of everybody than the notion that these boys, showing all the spirit that we expect a boy to show, rushed into these Air Services, and then for some reason of which they have been quite unaware—nerves, or something or other—they have suddenly found something fail, and they are killed. Somebody said something about the casualties at home being larger than the casualties at the front, but I have taken the trouble to ascertain, and I can say that is absolutely without foundation. There is nothing approaching that. There are very good reasons for not giving the facts about casualties. Every year the standard of flying required in order to obtain the wings—that is, to graduate in both Services—increases by leaps and bounds. A man who took his wings last year would not necessarily come anywhere near them in the standard of this year. The standard increases all the time, and the speed of machines also increases. Yet, in spite of that, and in spite of the immense increase in the number of men under 21, the percentage of casualties is not increasing. It is, I believe, falling. There is nothing that is watched more carefully, so far as anything can be watched, with all the care one would like in a Service growing as rapidly as the Air Service is, than this question of training. Every step that can be taken is taken for the purpose of reducing the risks in what must always be a dangerous and difficult art—namely, the mastery of the air—is taken whenever it seems possible.

Sir C. Seely: I asked as to the powers, if any, that the Versailles Council have over the Air Council?

Major Baird: Those powers are not defined yet. We have our representative at Versailles, but the exact power as between the two has not yet been defined. Undoubtedly, it will be in a short time.

Sir C. Seely: Will the House be informed what they are before they are agreed to?

Major Baird: I cannot guarantee that.

Mr. King: I beg to move to leave out from the word "That" to the end of the Question, in order to insert instead thereof the words "air attacks against the enemy should be carried out with military objectives and in such a manner as to avoid, as far as possible, injury to non-combatants, women and children."

The terms of this amendment indicate, I think, what is already the policy of the Government, of our armies, and of our Air Force. When we undertake military operations by air against the enemy we have in view, I believe—and we have only in view—the military objects that we can attain. That, I understand, has been the point of view which has been repeatedly stated by the Leader of the House, and I find that point of view very well stated in the words used only last night by the Under-Secretary of State for War when, speaking of the work undertaken by our men on the Western Front, he said that we have, in addition to numerous raids on important points behind the German front, and constant attacks by low-flying machines on the enemy's troops and transports, undertaken a series of extremely successful long distance raids in Germany. Railway centres, factories, and other military objectives have been attacked with success, sometimes by daylight. I am glad that he gives there no colour to the cry which has been ignorantly and, I think, unwisely and even ignobly raised in certain quarters that, because the enemy, in attacking us with aircraft, have killed women and children, we should set out with the first object of attacking and killing women and children. I am glad that not only in the statement of the hon. member yesterday, but in the *communiqué* issued now two or three times a week by the Commander-in-Chief in France, we have constant accounts of military attacks made by our aircraft, apparently, very successful in their results, but never undertaken primarily against non-combatants—women and children.

I am not always here to support or indicate adherence to Government policy, but, believing that on this occasion I can do so, it gives me all the greater pleasure. I understand that this is the policy of the Government, and I want it made quite clear in connection with our Air Force, because I think that it is of value and important to us as a nation to be able now, and still more at the end of the war, to say, that, though we were under grave and serious provocation, though we saw constant attacks upon our capital, which is mainly a peaceable city without great military character or importance, though we saw our women and

children killed and peaceful houses destroyed, yet our objects were military, and we intended to carry out this war from beginning to end on high and honourable lines, following as far as possible the civilised rules of warfare.

I have another and further reason for my amendment, and it is that there is said in certain quarters that reprisals have been taken, and even taken frequently, by our Air Force against enemy non-combatants. There appeared in one of Lord Northcliffe's papers a short time ago what purported to be a facsimile of a printed bill which we were given to understand was thrown from one of our aeroplanes as they flew over the enemy country. That bill stated, in German that the raid was made as a reprisal for the sinking of the "Lusitania." I would point out that the German was very bad, and in about ten words three were wrong, and there were three mistakes in grammar. I took the trouble to send this to my hon. friend the Under-Secretary of State for War. He very courteously made full inquiries as to whether any such bill was ever used or disseminated by the aeroplanes of our forces, and he gave me to understand that the whole thing was a fraud, notwithstanding this facsimile which Lord Northcliffe's paper published. I hope, therefore, that in his reply the hon. gentleman will tell me that I have estimated rightly the policy of the Air Ministry, and that if we undertake reprisals by aircraft against the enemy that they are done solely with a military objective.

Mr. Pringle: I beg to second the amendment.

I think it is extremely important that on this question of reprisals we should have a clear, definite, and authoritative statement from the Government as to what the policy is which the Government at the present time is pursuing. We have heard a great deal of loose talk in the Press, and, unfortunately, the loose talk has not been confined to the Press. There have been interviews, more or less authorised, with very important members of the Government which seem to indicate that our Government have undertaken a policy of reprisals against the enemy.

I want, therefore, first of all, a statement as to what the policy really is. I want to know whether it is a policy of reprisals such as the interesting and somewhat bloodthirsty interview with the Prime Minister would lead us to suppose. If it is a policy of reprisal, do the Government believe that it is going to have either of the results which alone can justify a policy of reprisals? These are questions which I think the Secretary to the Air Ministry ought to elucidate to the House, and if we have an authoritative statement it will be of advantage to the people of this country in clearing their minds as to what the policy is and what is its justification. At the same time, I do not think that any damage can possibly be done so far as enemy action is concerned if it is made clear that we are pursuing a policy which is based upon military considerations and those alone.

Major Baird: The difficulty in dealing with this question was indicated by the different views held by the mover and seconder of the amendment with regard to the importance of London from the military point of view.

Let us come down to bedrock facts. I do not know what happens on the German side, but everybody who has been on any kind of front at all knows that within 4 or 5 miles on our side of the line there are women and children, and you cannot drop a bomb anywhere on any inhabited place without running the risk of killing women and children. Nothing is more unfortunate. When the hon. gentleman says that he wants a declaration to the effect that our attacks against the enemy should be carried out with military objectives, I must point out, of course, they are military objectives. We are at war, and everything that we are doing has a military objective. "And in such a manner as to avoid, as far as possible, injury to non-combatants, women and children." What does "as far as possible mean"? Does any man for a moment think that any Englishman, Scotsman, Irishman, or Welshman would willingly kill a woman or child?—of course they would not.

Do not let us bandy words. It is impossible to drop bombs on any towns—German, French, or English—without running the risk of killing women and children. Does the hon. member mean that we are not to drop bombs on German towns?

Mr. King: No!

Major Baird: If that is not the hon. member's intention, then the whole of this amendment has no meaning whatever. The whole of the towns in the Rhine Valley are towns where munitions are manufactured. It would be difficult to mention one where these are not manufactured. They are all objectives of military interest, and it is perfectly open to us to bomb those places, just as it is open to the Germans to bomb our places. I am sorry I cannot more clearly define the intention and policy of the Government than that, but I think it is sufficiently categorical. We have started bombing German towns. We mean to continue bombing German towns, just as the Germans bomb our towns and will bomb our towns as long as they can. That is the policy of both countries. It is, unfortunately, one of the new phases of warfare invented by the Germans and carried out by them. I cannot say more than that.

Amendment negatived.

Original Question put, and agreed to:

"That a number of Air Forces, not exceeding 1,000, all ranks, be maintained for the Service of the United Kingdom of Great Britain and Ireland at home and abroad during the year ending on the 31st day of March, 1919."

On February 25th, on the Token Vote for 1,000 men of all ranks for the Air Service, Mr. Billing said: I think I called the attention of the House to the fact that 44 engines had been standardised. I was only speaking from memory when I said that 44 engines and spare parts for 44 engines were being, or had been, employed by the Royal Naval Air Service and the Royal Flying Corps respectively. When I refer to my books I discover that the figure should have been 61. I may say that our enemies, the Germans, have succeeded in reducing their standard engines to approximately 7 per cent. They employ 160 six-cylinder Mercedes and 260 six-cylinder and 240 eight-cylinder Mercedes; 130 six-cylinder and 240 six-cylinder Benz; 250 six-cylinder Maybach; 100 120 h.p. nine-cylinder rotary Mono-Oberhursel; and 160 or so Austro-Daimler. With one or two exceptions, this is practically the whole output of enemy aeroplane engines. A certain amount of experiment is justified, but, provided you can get the engines which will run efficiently at a horse-power weight of 2½ lbs., which is not a very great deal, is it not advisable rather to test the engine under all possible conditions, and not merely the test-bench conditions, which do not assist one in arriving at what an engine will do under all conditions in the

air? Having tested in all respects an engine of approximately 150 or even 200 h.p. and found it to be relied upon then I suggest that you should standardise such an engine, and carry only the spare parts for such an engine, instead of what we have been doing in the past.

That brings me to this question of the production of machines and to another most important point which I do want the Air Service and the Government to appreciate. I refer to this new scheme, which has been lately brought into being, of acceptance parks. The old idea, the old methods, of accepting aeroplanes in my days was that each firm was called upon to pass its machine through a certain test, and if they passed that test satisfactorily they were accepted. Suddenly someone in the R.F.C. had a brain wave that if they set up huge acceptance parks all over England, take down good service pilots and relieve the manufacturer of all responsibility of passing his own machine, it would increase output and hasten delivery. I have in my mind, in raising that point, one particular acceptance park. Let me take it only as an example of many other parks in this country. It is Kenley, which receives machines from Crayford, Richmond, Chelsea and Acton. What is the process? There is an inspector at the factories at Crayford, Richmond, Chelsea and Acton. The machine is made. It is completely erected, to the most minute details. Everything is tested and made right for flying inside the factory. Then the inspector passes it. Next the erectors take it all to pieces again, pack it in great wooden cases and put it on a lorry, and it is carried by this lorry some four or six miles to the acceptance parks at Kenley, where the crates are unpacked, and the whole machine erected and trued up again. A service pilot gets into it, tests it, and reports it all right, and then in many cases that machine is taken all to pieces again, packed up into its crate, and sent perhaps to some aerodrome where it is required.

I put it to any hon. member who has any experience of aviation and aeroplanes at all that by the time you have taken an aeroplane in pieces three times, and put it together again, it is practically a second-hand machine. When the inspector passes that aeroplane in a factory, it is either right or wrong. The question of doing its work depends absolutely on whether the power is there and whether the builders have carried out the design according to the drawings which have been passed by the Admiralty, plus the skill of the pilot. Why is it necessary to tear that machine to pieces? Where there is an aerodrome adjoining the shed where it is erected, it could be wheeled straight out, a pilot could get into it and put it through the test, and, if necessary, dismantle it at once, and then send it to whatever place it is required.

I do put it to the Committee that if these acceptance parks have proved to be what I say they have proved to be, one of the greatest wasters of public money, one of the greatest deterrents to efficient output, then we must do away with them, even if we have to scrap a complete unit of the Flying Corps in the process.

Major Baird: It is not difficult to reply to the speech of the hon. member for East Herts. I need hardly say his description of this country turning out to-day 61 different types of standardised engines is quite fantastic.

I have not the slightest intention of saying how many engines we are turning out. Nor how many types.

The Germans to-day are imitating the engines we used to make some time ago, but which we have improved upon lately. The hon. member talks with very little knowledge on these subjects, and when he suggests that we have standardised 61 engines or implies that we are still making them by giving a list of certain engines which have been used since the beginning of the war, all I have to say is that very few of them are being used to-day, and the idea that we are now wasting the energies of this country on the production of parts for 61 different engines is perfectly fantastic.

Under the present system, a machine is accepted by the Flying Service at the door of the factory. Up to the point when it leaves the factory the Ministry of Munitions is responsible. It is designed according to specifications, the material is also according to specifications, and the machine is built in accordance with the drawings and all the specifications that have been given. The Ministry of Munitions is not responsible for the flying quality of the machine. Long ago the first Air Board, when it was started, made a point of this. They said, "If our men have got to use these machines, we must be satisfied through our own men that the machines are correct, safe and sound to fly." That point is achieved, so we think, by the acceptance of the machines at the door of the factory. Sometimes they are accepted after they have been flown, and sometimes they are accepted unrected. It is merely a question of the manufacturers' convenience.

I come now to the real point of this Debate. The hon. gentleman is perfectly entitled to repeat the speech which he made on Thursday, but the matter which we are met here to discuss to-night is the number of officers and men in the Air Service. The number is put down as 1,000, but hon. members will find from the note to the Estimate that this is only a token number, and that the effective strength of the Air Force required to be authorised for 1918-19 is included in the number taken in Vote A of the Army. Obviously, it requires no explanation to the Committee why that system has been adopted. We do not desire the enemy to know how many men we are raising for our Air Force, and the round figures given for the Army will be sufficient to cover the Air Force. The Section of the Act showed roughly the conditions under which the officers and men of the Air Force are to be transferred. We are at present compiling at the Air Ministry a pamphlet, consisting of 29 pages, showing in detail the exact conditions under which officers and men will transfer. It will be scattered broadcast in a very few days, when it will be in the hands, not only of members, but, what is more important, of all the officers and men who will constitute the Air Force. In the first instance, of course, the Air Force will be formed by combining the R.N.A.S. and the R.F.C. The conditions under which men will be transferred are contained in the Air Force Act, and since there are not yet any men in the Air Force there is very little to say on the subject.

Question put, and agreed to.

PAY, &c.

Resolved, "That a sum, not exceeding £1,000, be granted to His Majesty, to defray the Expense of the Pay, &c., of His Majesty's Air Force at Home and Abroad, which will come in course of payment during the year ending on the 31st day of March, 1919."

Resolutions to be reported to-morrow.

AVIATION IN PARLIAMENT.

The Air Services.

In the course of his speech introducing the Army Estimates in the House of Commons on February 20th, Mr. Macpherson said: The chief feature in the Western theatre during the past two months has been the unremitting activity of our aircraft, which, in spite of every disadvantage of weather, have, in addition to numerous raids on various points of importance behind the German front and constant attacks by low-flying machines on the enemy's troops and transports, undertaken a series of extremely successful long distance raids into Germany. Railway centres, factories, and other military objectives in Lorraine, the Saar Valley, and along the Rhine have been attacked with success, sometimes by daylight. Serious damage has been effected, the results in many cases being photographed, and the German people have been forced to realise that we can, and will, retaliate for the raids which have been forced on British territory. Since January 1st bombing squadrons have made 11 raids on German

territory in the proportion of at least two to their one. It is satisfactory to note that recently the number of enemy aeroplanes brought down has shown a tendency to increase while our own losses have sensibly diminished.

Speaking with regard to the policy of decentralisation, Mr. Macpherson said: As an illustration of smoother working, expedition and economy, you have the Air Board and the Ministry of National Service. No doubt there were cogent reasons for establishing a new system for supplying to the Army aeroplanes in increasing number of greater speed and of greater reliability and regularity of type, and to do this outside the War Office. I do not inquire to-day whether that has been effected—that subject may be raised later on.

But what I do wish to draw the attention of the House to are the difficulties which are inherent under this system with regard to dual administration by both the War Office and the Air Board. There are considerable difficulties for the War Office. Take the personnel, the men and women who enter the Royal

Flying Corps; they are in the Army and subject to Army discipline; they are subject to the Regulations and restrictions of the Army Council as well as those of the Air Board. The Army Council cannot issue new Orders or new Regulations without consultation with the Air Board, neither can the Air Board issue its Regulations without consulting the Army Council. The result is considerable duplication and friction, and I believe a special staff has had to be created in order to co-ordinate the restrictions and regulations of the two bodies. Nobody for a moment can look on this as a system in which it is possible to secure economy; it cannot be economical either in time or money. Instances must occur to the minds of both the hon. and right hon. gentlemen opposite in which the body set up to co-ordinate and overcome the difficulties and friction between the two Departments has not always met with success in its efforts.

Mr. R. Harcourt spoke at considerable length on the subject of the aerial gunnery school in Ayrshire which had been abandoned, and said that the case taken as a whole was an obvious scandal and left him with an uneasy feeling that it might not be the only case.

Mr. J. Henderson referred to the wastage of petrol, and said he had been told by a chauffeur who had been to the front, "All I know is this, that when an aeroplane goes up it gets a supply of the very best petrol, but when it comes down after its voyage whatever is left of the petrol is turned out."

The petrol is turned out and fresh petrol is put in. I asked him what became of the old petrol, and he said it was used for all kinds of purposes, including washing the machine. If that is true, it is a terrible thing.

Replying to the debate Mr. Forster, referring to the alleged waste of petrol, said he would bring it to the notice of the Air Council, and no doubt it would be inquired into. With regard to the aerial gunnery school, he said the country was searched pretty well from end to end by the authorities of the R.F.C. before they selected the site in question. The Royal Engineers pointed out the difficulties, but after the matter had been considered several times, as the R.F.C. pressed to have it, the work of construction was proceeded with. The estimated sum necessary to complete from start to finish was £400,000.

Aeroplane Engines and Standardisation.

MAJOR NEWMAN, in the House of Commons on February 18th, asked the Minister of Munitions whether advantage will be taken of the fusion of the Royal Naval Air Service and the Royal Flying Corps to standardise as far as possible the many types of engines in use; and whether, to increase the output of the three or four types of engine which may be selected, all contracts which are at present outstanding for non-approved types will be cancelled and the firms thus deprived of work diverted to the production of one of the approved types?

Sir W. Evans: Action has been taken in the direction indicated as far as possible. My hon. and gallant friend will understand that it is impossible for me to give a detailed reply to his question.

Mr. Billing: Is the hon. gentleman aware that the Germans have standardised four types of engines with success, and we have standardised 44 types of engines without success, and will he see that the spare parts of these engines, which are of no further use, are not occupying the time of our munition workers?

Sir W. Evans: I cannot confirm my hon. friend's statement.

Aviation Ground, Ayrshire.

MR. SHAW, on February 19th, asked the Financial Secretary to the War Office whether he can state, approximately, the amount of the expenditure up to date upon, or in connection with, the scheme for an aviation ground in Ayrshire, whether roads and a railway were built, hutments erected, and land reclamation undertaken; whether proper engineering advice was taken before the site was selected and the expenditure incurred; and whether it is proposed to proceed with the scheme?

Mr. Macpherson: In answer to the first and second parts of the question, the amount expended on works services under the control of the War Office was about £400,000. Roads were built, hutments erected, and land reclamation undertaken. A temporary railway was made for part of the way, and a scheme for extension considered but refused on account of engineering difficulties. The answer to the third part is in the affirmative. Any question as to the future of this establishment should be addressed to the representative of the Air Board, as that Department is now in control.

Sir J. Walton: Before the work was begun was the advice of expert civil engineers sought, and was the expenditure submitted to and sanctioned by the Treasury?

Mr. Macpherson: I am not sure about the last part of the question, but the answer to the first part is in the affirmative.

Mr. Harcourt: Approximately, how long have these works been in operation? Were they not in operation for over a year, and has not this £400,000 been absolutely thrown away?

Mr. Macpherson: These works were, I believe, in operation for over a year. So far as the War Office are concerned, they went upon the most explicit and most expert advice.

Mr. Hogge: Is it not a fact that whereas my hon. friend has stated that the cost to the War Office was £400,000, the entire amount of money wasted was £1,000,000?

Mr. Macpherson: No. I am perfectly certain that my hon. friend exaggerates largely.

Enemy Air Raids.

SIR WILLIAM BARTON asked the Prime Minister whether, in the event of a raid causing injury to or death of cotton operatives whilst following their employment the Government will accept responsibility for payment of any compensation or damage to which the employer of such operatives or the owners or occupiers of cotton mills may be liable?

The Chancellor of the Exchequer (Mr. Bonar Law): His Majesty's Government would not be justified in relieving private employers of any liability which may rest upon them under the Workmen's Compensation Act, 1906, in respect of injury by accident sustained by workmen arising in the course of, and out of, their employment in the circumstances indicated in the question.

Sir W. Barton: Are the employers to be responsible under the Workmen's Compensation Act?

Mr. Bonar Law: I think that may be legally so.

Aerodrome, County Leinster.

MR. CLANCY, on February 20th, asked (1) the Financial Secretary to the

War Office whether the Air Board commandeered four or five months ago lands belonging to several persons in more than one district of a county in Leinster for aerodrome purposes; whether the compensation to be paid for the lands in question was assessed also some time since, but has not yet been paid, the farmers concerned being thus left without the means of purchasing other lands out of which they might be enabled to earn their living and to produce food; in view of the fact that the time for sowing and preparing the ground therefor is at hand and will soon pass away, whether the War Department or the Air Board will cause proper compensation to be paid without any further delay to the persons concerned; (2) the Under-Secretary of State to the Air Ministry whether, in selecting in one case, the particulars of which have been sent to the Board, land for the purposes of an aerodrome in a Leinster county, a tillage farm consisting of nearly 200 acres was alone commandeered, although it was surrounded on two or three sides by grass lands; whether this farm is now being actually converted into grass land, though the Irish Department of Agriculture is taking steps in the opposite direction, in view of the necessity of producing more food; who is responsible for this action of the Air Board; and whether it will be stopped?

Mr. Macpherson: Certain lands were commandeered some months ago in the locality referred to in the first question for aerodrome purposes, but owing to technical difficulties the proposed compensation has not yet been assessed. It is hoped, however, that the matter will soon be ready for submission to the Defence of the Realm Losses Commission, whose duty it is to determine the amount to be paid in such cases. The reason of the choice of the site referred to in the second question in preference to the adjoining pasture land was that it is absolutely level, requiring very little clearing work, and has a dry soil. The adjoining pasture land was ruled out by the technical flying officer. I need hardly say that the whole district was searched most carefully before the site chosen was decided upon.

Use of R.E. 8's.

MR. BILLING, on February 21st, asked the Under-Secretary of State to the Air Ministry whether he is still satisfied that the R.E.8 is a safe and useful type of machine for young pilots to fly; and whether the Air Ministry have decided to continue the building of this type?

Major Baird: The answer to the first part of the question is in the affirmative. The hon. member may rest assured that the Air Ministry makes it its constant business to see that the types of machines used by pilots are satisfactory both from the point of view of performance and safety, but it would be wholly contrary to the public interest to announce to the world at what time one type is likely to be displaced by another.

Air Force Uniform.

MR. P. A. HARRIS asked the Under-Secretary of State to the Air Ministry whether the new cloth for the officers and men of the Royal Flying Corps has been designed; if so, what is its colour and whether arrangements have been made for large quantities of it to be manufactured; if so, when it will be ready; and whether officers will be required to have their uniforms made therefrom?

Major Baird: The new cloth approved for the uniform of the Air Force is light blue. Difficulties of manufacture will, however, prohibit its introduction during the war, although it may be used by officers for evening wear. This, however, is optional. For the period of the war both officers and men will be clothed in a similar pattern uniform made of Army khaki cloth. No extra orders for cloth have been placed as it is considered that the Army supply will be sufficient.

Ayrshire Gunnery School.

MR. R. HARCOURT asked the Under-Secretary of State to the Air Ministry whether it has been decided to abandon the aerial gunnery school in Ayrshire on which £400,000 has been expended; whether the hutments are being or will shortly be demolished; if so, how long the works had been in progress before this decision was taken; and what portion, if any, of the works erected are to be regarded as otherwise than a dead loss for military purposes.

Major Baird: The answer to the first part of the question is in the affirmative. The hutments are being taken down and removed for use elsewhere. A good number have already been sent away. A contract was entered into in February, 1917. In regard to the last part of the question, I am unable to answer this at present.

Whitehead Aircraft (1917), Ltd.

SIR W. RUTHERFORD asked the Under-Secretary of State to the Air Ministry whether the Air Ministry have refused to recommend the Fresh Issues Committee at the Treasury to sanction the proposed increase of capital of Whitehead Aircraft (1917), Ltd., and, if so, on what grounds; whether he is aware that this concern has within a few months doubled its output; whether he is aware that the concern could readily obtain the £750,000 additional capital it desires permission to issue and has acquired the necessary land, and could again double its output in a few months; and if he will explain why facilities for so doing should be withheld, having regard to the constant wastage and urgent necessity for properly constructed machines?

Major Baird: The Ministry of Munitions will not oppose any reasonable scheme for raising capital by public issue. The Ministry of Munitions can meet its programme of requirements from facilities existing and arranged for without necessity of further extensions to Messrs. Whitehead. The issue of capital is asked to pay off financial liabilities in the way of advances made by the Ministry of Munitions.

Sir W. Rutherford asked the Chancellor of the Exchequer whether he is aware that Whitehead Aircraft (1917), Ltd., which makes machines for the Air Board, has grown rapidly and acquired land and all facilities for immediate extension, and its wages have risen to £11,000 per week, and its floor space to 325,000 sq. feet; whether he is aware that it has asked for permission to issue a further £750,000 capital and has secured promises of the £750,000 if permission could only be obtained, which would enable it in a few months to again double its output; and whether he will explain why the Fresh Issues Committee at the Treasury continue to refuse sanction to the proposed increase as not being in the public interest?

Mr. Bonar Law: I am informed that amended proposals have been made by this company, and that they have been agreed to with the exception of one small item.



German Losses on Italian Front.

DETAILED figures of the enemy aeroplanes destroyed on the Italian front, sent by the correspondent of the *Giornale d'Italia*, show that from Nov. 15th to Nov. 30th Italian aviators destroyed 25 enemy aeroplanes and British aviators one. During the same period seven Italian aeroplanes failed to return. In December the Italians destroyed 29 aeroplanes and lost 5, and British aviators destroyed 15 and lost two. In January the Italians destroyed 34 aeroplanes and lost 3, whilst the British destroyed 31 and lost 6. During the first week of February the Italians destroyed 13 enemy machines

and the British 21. The total number of enemy aeroplanes destroyed on the Italian front by Italian and British aviators from Nov. 15th to Feb. 5th was thus 189.

French Capture a Hun Machine.

A GERMAN chaser aeroplane which had lost its bearings was forced to land at noon on Feb. 16th between Vaudoy and Rozoy (Seine-et-Marne), says the *Intransigeant*. The two occupants were taken prisoners by a sergeant before they were able to carry out their intention of setting fire to the machine, which was captured intact.

The British Air Service

"PER ARDUA AD ASTRA"

Royal Flying Corps (Military Wing).

London Gazette Supplement, February 19th.

The following appointments are made:—
Staff Officer, 1st Class.—(Graded as a G.S.O., 1st Grade, at the War Office.)
 —Bt. Maj. G. D. Pidgeon, S.R., from a Staff Officer, 2nd Class (graded as a Brig. Maj.), and to be Temp. Lieut.-Col. whilst so employed; Feb. 1st.
Staff Officer, 2nd Class.—(Graded as a G.S.O., 2nd Grade, at the War Office.)
 —Maj. H. A. Moore, M.C., Lond. R. (T.F.); Jan. 28th.
Flying Officers.—Capt. C. O. Lilly, D.S.O., Dorset. R.; Jan. 24th. Lieut. P. Q. Reiss, Lan. Fus., from M.G. Corps; Jan. 27th. Lieut. H. A. Laws, Saskatchewan R., Canadian Exped. Force, from a Flying Officer (Obs.), seniority from Jan. 24th, 1917; Lieut. F. Hotrum, Canadian M.G. Corps; Jan. 29th. Temp. 2nd Lieuts. (on prob.), Gen. List, and to be confirmed in their rank:—H. Croudece; Dec. 17th, 1917. R. P. Bufton, H. G. S. Phipson, J. F. Shaw, H. G. Kirkland, D. McQ. Smith; Jan. 27th. E. P. Morgan, A. C. Hill; Jan. 28th. E. O. Danger; Jan. 29th.

Temp. 2nd Lieut. (Temp. Capt.) N. E. Barraclough, M.C., Gen. List, reverts from a Flight Comdr. and relinquishes the rank of Temp. Capt.; Jan. 26th, seniority from Feb. 18th, 1917.

Capt. J. L. Head, Lond. R. (T.F.), reverts from a Flight Comdr.; Feb. 2nd, seniority from July 9th, 1916.

General List.—2nd Lieut. L. V. Rothschild, from R.F.C., S.R., to be Temp. Lieut.; March 6th, 1917. Temp. 2nd Lieut. V. Stevens relinquishes his commission on account of ill-health contracted on active service and is granted the hon. rank of 2nd Lieut.; Feb. 20th. Cadets to be Temp. 2nd Lieuts. (on prob.):—H. H. Ankrett, R. W. Brigstock, R. A. C. Brie, D. C. Burke, W. Blackburn, W. Brennan, F. W. Chester, A. V. Campbell, J. B. Cockin, T. B. Dodwell, H. Dyson, A. Findley, G. McM. Findlay, W. Forbes, P. E. I. Foot, T. Garlick, F. A. Gledhill, P. A. Hand, E. Hardcastle, H. S. Hind, S. G. Hawkey, A. Hogg, W. N. Hicks, A. E. Harris, E. Hill, A. C. Howell-Jones, W. R. Jackson, C. E. King, W. Middleton, F. Player, C. G. Pickard, R. K. Pollard, F. Pearson, W. I. Parke, A. Purdy, B. Rawlings, S. E. Rowley, A. Shrivies, A. E. Sherwood, H. Shaw, C. Thomas, E. W. Tatnall, A. E. Tompkins, J. E. Weston, K. C. B. Woodman; Jan. 30th.

Supplementary to Regular Corps.—Lieut. F. H. Whiteman resigns his commission and is granted the hon. rank of Lieut.; and 2nd Lieut. L. R. J. Williams resigns his commission on account of ill-health, and is granted the hon. rank of 2nd Lieut.; Feb. 20th.

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The following temporary appointments are made at the War Office:—
Director-General of Military Aeronautics.—Bt. Col. (Temp. Brig.-Gen.) E. L. Ellington, C.M.G., R.A., from Dep. Dir.-Gen., to retain his temp. rank while so employed, and to remain secd.; Jan. 14th.

The following appointments are made:—
Equipment Officers, 3rd Class.—2nd Lieut. F. Whilton; Oct. 18th, 1917. Temp. 2nd Lieuts. Gen. List:—J. G. Tennant; Sept. 20th, 1917. A. Forsyth, Oct. 18th, 1917. W. L. S. Jackson, from Oct. 19th, 1917, to Feb. 9th; V. C. Sykes; Oct. 20th, 1917. Temp. Lieut. W. J. Watts, Training Res.; Jan. 9th.

Chief Experimental Officer.—(Graded as a Park Comdr.)—Capt. R. B. Bourdillon, M.C., S.R., from a Staff Officer, R.F.C., 2nd Class (graded as a G.S.O., 2nd Grade, at the War Office), and to be Temp. Maj. whilst so employed; Feb. 1st.

General List.—Temp. 2nd Lieut. D. A. Hunter resigns his commission to resume his medical studies; Temp. 2nd Lieut. C. L. Smith resigns his commission; Feb. 21st. W. L. S. Jackson, late Temp. Capt., to be Temp. 2nd Lieut., from Oct. 19th, 1917, to Feb. 9th; P. Mendoza, late 2nd Lieut., H.A.C. (T.F.), to be Temp. 2nd Lieut. (on prob.); Jan. 25th.

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Attached to Headquarters Units.

Commander.—Bt. Col. (Temp. Maj.-Gen.) J. M. Salmond, C.M.G., D.S.O., R. Lanc. R., and to retain his temp. rank while so employed, vice Maj.-Gen. Sir H. M. Trenchard, K.C.B., D.S.O.; Jan. 18th.

The following appointments are made:—
Flight Commanders.—From Flying Officers, and to be Temp. Capts. whilst so employed:—Temp. 2nd Lieut. A. B. Coupal, Gen. List; Oct. 1st, 1917. Lieut. L. R. Andrews, Canadian Local Forces; Lieut. W. C. Gage, S.R.; Dec. 1st, 1917. Lieut. H. A. B. Robb, M.C., S.R.; Jan. 1st.

Flying Officers.—Temp. 2nd Lieut. W. T. Lewis, Gen. List; Oct. 28th, 1917. Temp. 2nd Lieut. (on prob.), Gen. List, and to be confirmed in their rank:—A. A. Leitch; Oct. 2nd, 1917. G. F. Touchard; Dec. 5th, 1917. T. H. Potter; Dec. 7th, 1917. J. I. T. Jones; Jan. 11th.

Flying Officers (Observers).—Temp. 2nd Lieut. J. C. Boughton, Suff. R., seniority from Sept. 9th, 1917, and to be transf'd. to R.F.C. Gen. List; Jan. 21st. Seniority from Oct. 16th, 1917:—Lieut. R. Foley, M.C., E. Ontario R.; Temp. Lieut. J. J. Coleman, 5th S. Wales Bord., and to be transf'd. to R.F.C. Gen. List; Lieut. W. Ronald, A.S.C. (T.F.), and to be secd.; 2nd Lieut. J. A. Fitz-Herbert, M.C., R.G.A., S.R.; Jan. 22nd, seniority from Nov. 14th, 1917. Lieut. G. E. Eucas, W. Ontario R.; Jan. 19th, seniority from Nov. 16th, 1917. Capt. G. F. Yarde, A.S.C., and to be secd.; Jan. 22nd, seniority from Nov. 20th, 1917. 2nd Lieut. H. G. Crowe, R. Ir. R., and to be secd.; Jan. 23rd, seniority from Nov. 28th, 1917. Lieut. J. B. L. Heney, M.C., Canadian F.A., seniority from Nov. 29th, 1917. Lieut. W. Aitchison, M.C., R.F.A., S.R., seniority from Dec. 5th, 1917; Jan. 21st. Temp. 2nd Lieuts. (on prob.), Gen. List, and to be confirmed in their rank:—C. F. G. Doran, seniority from Nov. 4th, 1917. T. McGovern, seniority from Nov. 20th, 1917. The rank of Lieut. L. F. Cameron, Canadian Inf., is as now described, and not as in the Gazette of Aug. 27th, 1917.

Park Commander.—Lieut. (Temp. Capt.) D. S. Jillings, M.C., W. York. R., from an Adj., and to be Temp. Maj. whilst so employed; Feb. 1st.

Equipment Officers, 3rd Class.—2nd Lieuts. C. A. C. Fidler, R. D. G. Macrostie and F. W. Powell; Oct. 28th, 1917. Temp. Lieut. F. McGuffie, R. Lanc. R., and to be transf'd. to R.F.C. Gen. List; Dec. 19th, 1917. Lieut. W. H. Tweddell, Durh. L.I. (T.F.), and to be secd.; Lieut. C. C. Morgan, R.F.A., S.R.; Temp. 2nd Lieut. E. J. K. Dyer, att'd. R. Fus., and to be transf'd. to R.F.C. Gen. List; Jan. 18th. Temp. 2nd Lieuts. (on prob.), Gen. List, and to be confirmed in their rank:—B. Benson; July 13th, 1917. G. F. Pugsley; Dec. 6th, 1917. V. L. Fielder; Jan. 14th. A. G. Ackermann; Jan. 25th. L. W. Scoggins; Jan. 26th.

General List.—Temp. Lieut. V. W. Harrison relinquishes his commission on account of ill-health contracted on active service, and is granted the hon. rank of Lieut.; Temp. 2nd Lieut. W. White relinquishes his commission on account of ill-health contracted on active service, and is granted the hon. rank of 2nd Lieut.; Feb. 22nd. Pte. W. T. Lewis, from Yeo. (T.F.), to be Temp. 2nd Lieut.; Sept. 3rd, 1917. The following from R.F.C. to be Temp. 2nd Lieuts.:—Sergt. (Pilot) G. P. Olley; Jan. 28th. Flt. Sergt. C. T. Holt; Feb. 4th. To be Temp. 2nd Lieuts. (on prob.):—L. K. W. Barrett, F. A. Black, R. B. Beebe, C. T. Bremickar, C. S. Booker, J. M. Brown, E. H. Bullen, T. W. L. Burke, J. D. Cook, M. P. Crane, R. J. Donaldson, F. D. Evans, O. E. Fleming, G. W. Gorman,

M. Goldsmith, F. R. Girardot, R. H. Gast, J. H. L. Gower, W. B. Henderson, R. L. Hollingsworth, T. R. Hostetter, L. A. C. Hudson, I. W. Hunter, E. R. Huston, R. N. Hayden, V. R. V. T. Irvine, J. A. Jackson, M. F. Korslund, S. P. Kerr, V. Kennedy, H. J. Leavitt, F. A. Lewis, J. P. Lloyd, M. B. Lewis, G. F. Manning, R. Moore, D. M. Murray, R. Murray, J. P. Murphy, J. C. R. Manning, J. J. Miller, A. E. Mewett, P. S. Manley, A. McAllister, R. S. MacLachy, W. McMahon, C. M. Norman, H. S. Pelton, R. A. Peterson, C. F. Pineau, J. R. Quinn, D. G. Reid, F. E. Robinson, D. McK. Sheridan, E. C. Shurley, G. Stephenson, C. A. Stewart, W. C. Seymour, F. T. S. Schl, A. T. Sampson, T. M. Thompson, C. P. Uhrich, W. C. Whitthorne, C. L. Wood, J. C. Wilson, G. A. Wightman, I. De W. Wood, C. J. Woods; Dec. 19th, 1917.

Memorandum.—Temp. Sergt.-Majs., from R.F.C., to be 2nd Lieuts. while serving with R.F.C.:—C. A. Fidler, F. W. Powell, R. D. G. Macrostie; Oct. 28th, 1917. F. Baker, Jan. 20th.

Supplementary to Regular Corps.—To be 2nd Lieuts. (on prob.):—F. S. Gordon M. D. Sinclair; Nov. 16th, 1917.

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The following appointments are made:—
Flight Commanders.—From Flying Officers and to be Temp. Capts. whilst so employed:—Temp. Lieut. J. T. Collier, Gen. List, Lieut. T. M. R. Newton, R. Berks. R.; Jan. 1st. Temp. Lieut. G. W. Gathergood, Gen. List, Lieut. C. J. Chabot, S.R., Lieut. C. S. T. Lavers, W. York. R., S.R., Temp. 2nd Lieut. (Temp. Lieut.) G. E. Ransom, att'd. R. Fus., and to be transf'd. to R.F.C. Gen. List; Temp. Lieut. A. R. Nock, Gen. List, Lieut. J. A. Boret, M.C., R.W. Surr. R. (T.F.), and to be secd.; Lieut. P. Thompson, S.R., 2nd Lieut. (Temp. Lieut.) G. H. Harrison, Midd'x R. (T.F.), 2nd Lieut. P. N. Hall, M.C., R.F.A., S.R.; Temp. 2nd Lieut. A. E. Godfrey, M.C., Gen. List; Feb. 1st.

Flying Officer.—Capt. A. A. Greenslade, S. Lan. R., S.R., is granted seniority (without pay prior to April 24th, 1917) from May 24th, 1916.

Equipment Officers, 1st Class.—From the 2nd Class:—Capt. L. S. Metford, S.R.; Dec. 1st, 1917. And to be Temp. Capts. whilst so employed:—Lieut. R. E. H. Daniel, S.R.; Temp. Lieut. T. N. Gilbert, Gen. List; Lieut. T. A. B. Rolfe, S.R.; Jan. 1st. 2nd Class.—From the 3rd Class:—Lieut. E. Gayton, R.A.; 2nd Lieut. G. J. Blackmore, S.R., and to be Temp. Lieut. whilst so employed; Dec. 1st, 1917. Lieut. J. P. Francis, Can. Local Forces; Jan. 1st. And to be Temp. Lieuts. whilst so employed:—Qrmr. and Hon. Lieut. W. F. Kisbey (T.F.) Res.; Temp. 2nd Lieut. J. E. Macloghlin, Gen. List; Temp. 2nd Lieut. A. Gane, Gen. List; 2nd Lieut. D. H. Blakie, S.R.; 2nd Lieut. F. D. Williams, S.R.; 2nd Lieut. C. D. Fairweather, S.R.; Jan. 1st.

Assistant Instructor in Gunnery.—(Graded as an Equipment Officer, 2nd Class.)—2nd Lieut. S. A. Turner, L'pool R. (T.F.), from an Asst. Instr. in Gunnery (graded as an Equipment Officer, 3rd Class), and to be Temp. Lieut. whilst so employed; Jan. 22nd.

Schools of Instruction.—Schools of Military Aeronautics.

Instructors.—(Graded as a Flight Commander.)—2nd Lieut. (Temp. Lieut.) R. Collis, E. Surr. R., a Flying Officer, and to be Temp. Capt. whilst so employed; May 26th, 1917. (Graded as an Equipment Officer, 1st Class):—2nd Lieut. (Temp. Lieut.) G. A. Hilliar, Glouc. R., from an Asst. Instr. (graded as an Equipment Officer, 2nd Class), and to be Temp. Capt. whilst so employed; May 26th, 1917.

Assistant Instructors.—(Graded as Equipment Officers, 2nd Class.)—And to be Temp. Lieuts. whilst so employed:—Temp. 1st Lieut. H. R. Hare, Gen. List, a Flying Officer (Obs.); Temp. 2nd Lieut. H. Polladr, Gen. List, as Equipment Officer, 3rd Class; Dec. 1st, 1917.

School of Technical Training.

Chief Instructor.—(Graded as a Park Commander.)—Temp. Capt. J. Jensen, Gen. List, from an Instr. (graded as an Equipment Officer, 1st Class), and to be Temp. Maj. whilst so employed; Jan. 31st.

Instructors.—(Graded as Equipment Officers, 1st Class), and to be Temp. Capts. whilst so employed:—2nd Lieut. (Temp. Lieut.) H. E. Steinberg, S.R. from an Instr. (graded as an Equipment Officer, 2nd Class); 2nd Lieut. (Temp. Lieut.) D. Richardson, S.R., from an Asst. Instr. (graded as an Equipment Officer 2nd Class; Jan. 31st.

Armament School.

Assistant Instructor in Gunnery.—(Graded as an Equipment Officer, 2nd Class.)—The regiment of Capt. P. S. Jackson-Taylor is Hereford R. (T.F.), and not as in the Gazette of Jan. 25th.

General List.—Temp. 2nd Lieuts. to be Temp. Lieuts.:—D. A. Parsons, H. W. Hamer, J. J. Gaynor, F. Gartside-Tipping, V. J. Copestake, M.C., C. V. Anthony; July 1st, 1917. D. P. Cox; Nov. 15th, 1917. (Temp. Lieut.) J. S. Williams, M.C.; Nov. 30th, 1917. J. A. Hoogterp; Dec. 12th, 1917. G. F. Lines, M.C.; Dec. 17th, 1917. H. F. N. Jones; Dec. 20th, 1917. (Temp. Lieut.) G. Baillie; Jan. 2nd. (Temp. Lieut.) R. E. Wakelin, R. Turner, G. F. Turberville, C. J. Thompson, S. Smith (Temp. Capt.) W. H. N. Shakespeare, H. Sanders, H. E. Rahtkens, W. D. Patrick, F. R. Mangham, C. R. H. Jackson, H. D. Higham, J. F. Guinan, E. V. Gibson (Temp. Capt.) R. E. G. Fulljames, M.C., W. G. Foulds, J. W. Foreman, R. B. Corfield, E. W. Carmichael, C. Booth, (Temp. Capt.) L. I. Barker; Jan. 7th. A. J. Salton, (Temp. Capt.) J. H. O. Jones; Jan. 8th. (Temp. Capt.) E. P. Wilmot, M.C., (Temp. Lieut.) A. D. Goodwin; Jan. 15th. C. W. Adkin; Jan. 17th. C. V. Thornton; Jan. 19th. W. E. V. Richards, A. Morgan, T. S. Edleston; Jan. 22nd. To be Temp. 2nd Lieuts.:—Pte. W. E. Critchley, from A.S.C., Pte. D. P. McN. Laing, from A.S.C.; Nov. 13th, 1917. 2nd Class Air Mech. A. F. Cotton, from R.F.C., Actg.-Sergt. P. Phillips, from R.F.C.; Nov. 27th, 1917. 1st Class Air Mech. A. C. Edgley, from R.F.C.; Nov. 30th, 1917. Actg. Sergt. F. W. Carryer, from A.S.C., 2nd Class Air Mech. J. B. Bales, from R.F.C., Gnr. E. T. Cosslett, from M.G. Corps, Corpl. R. Morrogh, from R.E., Pte. C. D. Jennery, from A.S.C.; Dec. 1st, 1917. 2nd Class Air Mech. C. F. Pearson, from R.F.C., Corpl. F. Latham, from N. Zealand A.S.C., 1st Class Air Mech. A. P. Dale, from R.F.C.; Dec. 3rd, 1917. 2nd Class Air Mech. G. F. Greengrove, from R.F.C., L. Sergt. P. Hubbard, from R. W. Kent R. (T.F.); Dec. 5th, 1917. Pte. G. T. Eveleigh, from Som. L.I. (T.F.), Corpl. F. L. Roper, from R.E., Co. Sergt.-Maj. A. Hyland, from R.W. Kent R. (T.F.), Pte. C. H. Harrison, from A.S.C., 1st Class Air Mech. E. Seymour, from R.F.C.; Dec. 6th, 1917. 1st Class Air Mech. P. B. Whillier, from R.F.C., Sergt. A. G. Dickinson, from Canadian A.M.C., 2nd Class Air Mech. E. B. Robinson, from R.F.C.; Dec. 7th, 1917. Sergt. R. J. H. Holland, from R.F.C., Sergt. D. S. Mackenzie, from R.F.C.; Dec. 8th, 1917. To be Temp. 2nd Lieuts. (on prob.):—E. V. Solomon; Nov. 26th, 1917. H. S. Holcombe, W. L. Brintnell; Dec. 4th, 1917. C. P. Douglas, W. St. J. Miller, L. McLaughlin; Dec. 10th, 1917. J. P. Standfast; Dec. 11th, 1917. S. C. Leware; Dec. 15th, 1917. C. H. Andrews, H. D. Copland, R. P. Darrell, F. James, L. W. Kinzer; Dec. 18th, 1917. E. E. Ballough, H. A. Laurie; Dec. 21st, 1917. C. G. Cole-ridge; Dec. 22nd, 1917. B. R. Redman; Dec. 24th, 1917. Cadet S. MacG. Brown, from R.F.C.; Jan. 12th. A. J. Miller, late Leading Mech., R.N.A.S.; Jan. 25th. 3rd Class Air Mech. G. L. Meehan, from R.F.C.; Feb. 1st. A. Elson, W. E. Barber, 2nd Class Air Mech. H. Jacques, from R.F.C., Sergt. B. B. Long, from R.F.C.; Feb. 4th. Chief Petty Officer J. Dow, from R.N.V.R. Feb. 5th. 1st Class Air Mech. W. Hill, from R.F.C.; Feb. 16th.

AIR RAIDS ON GERMANY.

THE Air Ministry has issued the following list of air raids which have been made into Germany between December 1st, 1917, and February 19th, inclusive, a period of 81 days:—

Date.	Objective.	Locality.	Popu- lation.	Weight in lbs. of bombs dropped.
Dec., 1917.				
5	Railway sidings ..	Zweibrücken	14,700	1,344
5	Works ..	Burbach	See Saar- brücken.	1,096
6	Works ..	Burbach		2,216
11	Boot factory ..	Pirmasens ..	34,000	1,594
24	Factories ..	Mannheim ..	290,000	2,252
Jan., 1918.				
3-4	Railways ..	Nr. Metz ..	100,000	760
4-5	Railways ..	Nr. Metz ..	100,000	2,940
5-6	Town ..	Courcelles ..	See Metz	1,344
5-6	Town & railway ..	Conflans ..	See Metz	2,180
14	Munition factory and railways ..	Karlsruhe ..	140,000	2,800
14-15	Steel Works ..	—*	13,000	2,105
"	Railways ..	Metz ..	100,000	524
"	Railways ..	Ebingen ..	See Metz	280
16-17	Railways ..	Bensdorf ..	—	280
"	Town ..	Orny ..	—	255
"	Searchlight ..	Vigny ..	—	25
21-22	Steelworks ..	—*	13,000	1,220
"	Railway sidings ..	Bensdorf ..	—	2,210
"	Railway junction ..	Arnaville ..	—	1,344
24-25	Steelworks, rail- ways & barracks {	—*	13,000	1,120
"	Railway ..	Oberbillig ..	48,200	809
"	Factory ..	Mannheim ..	290,000	280
"	Railway ..	Saarburg ..	9,000	672
"	Steelworks ..	—*	13,000	280
27	Barracks & station	—†	48,000	1,344
28	"	—†	48,000	230
Feb., 1918.				
9-10	Railway ..	Courcelles ..	See Metz	1,844
12	Town ..	Offenburg ..	15,400	2,844
16-17	Railway station ..	Conflans ..	See Metz	1,488
17-18	" sidings	Conflans ..	See Metz	2,240
18	Steelworks & sta.	—*	13,000	936
18	Barracks & station	—†	48,000	1,250
18-19	"	—†	48,000	2,206
18-19	Rly. & gasworks ..	—*	13,000	650
19	Station ..	—†	48,000	2,400

* Thionville. † Trèves.

French Airship Lost.

SOME details regarding the loss of a French dirigible while scouting over the channel off St. Adresse, near Havre, on the morning of February 20th are reported by the *Temps*. Following an accident with her rudder the airship collided with the cliff at Heve; a violent explosion followed, and Commandant Fleury, the captain of the dirigible, and another man were killed, while the quartermaster was thrown to the ground and had his right arm broken. Owing to the collision the bombs on board the dirigible exploded and wounded a number of persons who had arrived on the scene. The dirigible was entirely destroyed.

New German Aerodrome near Ghent.

APPARENTLY the attention given to German aerodromes in Belgium by our bombing squadrons is having its effect. The *Telegraaf* learns from the frontier that the Germans are constructing, by the forced labour of over 1,500 civilians, a new aerodrome near Quatrecht, which is six miles east of Ghent on the railway from that city to Antwerp. It is also reported that the German air service is being extended in view of the spring offensive.

Portuguese Bag a Gotha.

It was disclosed in the official report on the week's work on the Portuguese section of the Western Front, issued on February 20th, that a Gotha machine had been brought down in that area. The two officers and two sergeants forming the crew were captured.

Lighthouse on Dutch Boundary.

APPARENTLY the different mistakes which have led to the dropping of bombs on Dutch territory have decided the local authorities to take action, for the *Vaderland* reports that an iron lighthouse has been put up near Selzaete, on the Dutch-Belgian frontier, to indicate the boundary to aviators.

SIDE-WINDS.

THOSE who favour Burberry clothing now have an opportunity of assisting to solve the problem of what to do with our discharged soldiers and sailors, as this famous firm have taken the entire output of Blighty Tweeds, which are woven entirely by disabled heroes. The "Blighty" scheme provides instruction and looms for a large number of men; the organisation is entirely self-supporting and owes nothing to State aid or charity. Blighty tweeds are sold at the lowest possible economic price and every member of the public who purchases them experiences the satisfaction of feeling that he is making some practical return for the self-devotion of our soldiers and sailors, apart from the acquisition of an essential commodity that pays for itself in quality and staunch service. Every piece of Blighty tweed is marked with the name of the man who has woven it, who is thus brought into direct contact with the purchaser. Blighty tweeds may either be obtained at Burberry's Haymarket house or of any of their authorised agents.

THE other day the employees of Airships, Ltd., at Merton, had the pleasure of listening to a most interesting and forceful address by Mr. Spencer Leigh Hughes, M.P. (Sub Rosa). The chair was taken by Mr. A. E. Webb, general manager of the company, supported by Mr. R. F. Dagnall, manager of Wandsworth, Clapham and Merton Works. Mr. Hughes opened with an appreciation of the way in which the workers had assisted in the carrying on of the war. He reminded them of the great issues that were dependent on the faithful sustaining help of the working people of this country, and conveyed a message of gratitude from Mr. Lloyd George for the manner in which they are assisting in the great national struggle. The war, he pointed out, has become more and more a war of mechanics, of skill, of character on the part of the workers, and he reminded them that we are pitted against the artifices and skill and energy of the Germans which it was no use under-estimating, but because he knew something of the working people of this country he was convinced we must win. Referring to the desire of some people to settle the war by negotiation, he asked, "Who are you going to settle it with?" We might be sure that if we entered into a premature peace now, the Kaiser and his adherents would begin preparing for the next attack. He concluded by saying that although we could not see the actual work done by airships, the result of the workers' faithful labours, they might be sure that these ships fully represented them in the air, over sea and land. He believed we were reaching the end more rapidly every day because of the work of the people up and down the country.

In the current issue of *System* appears an interesting four-page article upon the re-creation of war-worn machinery, by Mr. C. W. Brett, managing director and general manager of Barimar, Ltd. In this story of a new industry which the war has brought into prominence in Britain, Mr. Brett deals with the various processes brought into use for successful metal fusion, including oxy-acetylene, electric, and thermit welding, describing in detail the chief characteristics and uses of each.

It is not without significance that Barimar, Ltd., have within the last few days been invited from three separate quarters to establish branches of their business in the United States, Italy and India.

THE practical interest which Mr. and Mrs. Whitehead take in welfare work was again demonstrated by their lending their fine house at Richmond for an entertainment with the object of assisting the funds of the Richmond and Shoreditch School for Mothers. Among those present were Queen Amelia, Viscountess Grimston, and Lady Yoxall, and those who contributed to an excellent programme included Mlle. Alice Delysia, Miss Lois Barker, Mr. Percy Tarling, Miss Chrystable Conway, Miss Lydia Stace, Mr. Leslie Stiles, Miss Esme Beringer, as well as many others. As a result of the entertainment some £90 was raised.

TROUBLES never come singly, 'tis said, and so both the nines in the address of the Aeroparts Manufacturing Co., Ltd., as given in these notes last week, were transposed, making it read 166, Piccadilly, whereas the headquarters still remain at 199, Piccadilly, W. 1.

His friends will be glad to hear that Mr. R. F. Mann—who has been invalided out of the Army—as a result of treatment at a sanatorium, is making splendid progress. He hopes in a few weeks now to be actively at work again in connection with aviation.

LEGAL INTELLIGENCE.

Similarity in Trade Names.

IN the Chancery Division of the High Court of Justice, before Mr. Justice Neville, the A. G. S. Manufacturing Co. (Ltd.) moved for an interim order until the trial of the action restraining the Aeroplane General Sundries (Ltd.) from carrying on business in or advertising or selling their goods under the name of A. G. S. (Ltd.), and from otherwise causing confusion between the businesses and goods of the plaintiffs and the defendants. On January 23rd last the plaintiffs issued a writ against the defendants for an injunction.

Plaintiffs, in their affidavits, showed that in the aeroplane industry the initials "A. G. S." had two distinct meanings. First, when applied to general aeroplane parts they referred to what was known throughout the trade as the Aeronautical General Schedule, an official document issued by the Royal Aircraft Factory, which designated by means of numbers and names every standard part of an aeroplane. In the second place the letters, when applied to a company, referred in the trade to the goods in which the plaintiff company dealt. The defendants were using the letters "A.G.S." in their advertisements in the aircraft periodical called "FLIGHT" so as to lead to the inference that they were the plaintiff company. The plaintiffs did not claim a monopoly of the letters A. G. S., but they strongly objected to their being used in the defendants' advertisements in connection with the word "Limited." So used they would lead to confusion in the industry, and orders intended for the plaintiff company would reach the defendant company.

For the defendants it was not admitted that anyone had been misled by the advertisements, any intention of appropriating the letters "A. G. S." as part of the defendant company's name was disclaimed. Those letters were well known in the trade to mean certain standard parts of aeroplane sundries, and it was impossible for any persons in the trade to assume that the letters "A. G. S." alone referred to the plaintiffs or to any particular firm or company dealing in aeroplane sundries. But without prejudice, and with a view to putting an end to the whole matter, the defendants were willing to give an undertaking not to repeat two of the advertisements complained of, which might, perhaps, be objectionable in some respects.

Mr. Justice Neville said he thought it was a case in which the parties might very reasonably come to terms, and after discussion it was arranged that the motion should stand over with a view to a settlement.

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More Bombs on Holland.

THE Amsterdam *Handelsblad* learns that on the evening of February 17th an aeroplane dropped bombs on a meadow near Sluis (Zeeland).

The Raids on Trèves.

THUS the *Cologne Gazette*: About noon on February 18th enemy airmen dropped a number of bombs on various parts of Trèves, causing some material, but no military damage. At noon on February 19th Trèves was again the object of aerial attack, to which one civilian and one soldier fell victims. Otherwise only material damage was caused.

The Italian Visit to Innsbruck.

THE following story of the Italian raid on Innsbruck, on the afternoon of February 20th, was sent out from Vienna on the following day:—"Four enemy machines, with a machine gun and three bombing machines, flew over Innsbruck, coming from a southerly direction, and dropped about eight light bombs of from 10 to 25 kilogrammes, including three incendiary bombs. Damage was done to various parts of the town. One woman was killed and two persons were badly injured, whilst several others were only slightly injured. The battle planes descended to an altitude of about 900 ft.

Garros and Marchal.

IT was with a thrill of pride that most people read the report printed by the Maastricht *Les Nouvelles* that Lieut. Garros and Lieut. Marchal had escaped from Germany and had reached Holland. The following day, however, an emphatic denial was given to the story by the French Consul at Rotterdam, but there is still some hope that it is true. Lieut. Garros was captured in April, 1915, while Lieut. Marchal fell into German hands at Cholm in June, 1916, after his exploit of dropping proclamations on Berlin.

To Encourage French Gotha Strafers.

THE recent moonlight raid on Paris has apparently inspired a resident of Barcelona to offer 5,000 francs to be distributed among French aviators who succeed in bringing down a second raider over Paris.

COMPANY MATTERS.

Rolls-Royce, Ltd.

THE directors announce that it is again impracticable to submit the usual accounts at the annual meeting, but they are satisfied, after anticipating that large depreciation will have to be made in respect of capital expenditure, that the profits for the year ended October 31st, 1917, warrant the payment of a dividend of 10 per cent. The directors point out that the company in past years has retained and carried forward to reserve the major part of the profits, only distributing a portion in dividends. The amounts so retained aggregate a sum exceeding the issued capital, and they propose that a part of this retained profit shall be distributed, and the capital be increased, and a bonus of one fully-paid £1 share be issued to each shareholder for each share held by him.

Auto-Carriers.

THE report of Auto-Carriers (1911), Ltd., for the year ended September 30th last, shows a net profit, after writing £1,000 off goodwill and providing for Debenture interest and income-tax, but subject to special taxation, of £52,370. A half-year's interim dividend at the rate of 10 per cent. per annum on the preference shares and 6 per cent. per annum on the deferred was paid in May, and the directors recommend the payment of the balance due on the deferred shares and a further dividend of 10 per cent. on the preference shares, making 20 per cent. for the year, together with a distribution amounting to £2,531 on the deferred shares.

Auster (1914), Ltd.

THE report of Auster (1914), Ltd., for the year ended December 31st last, states that the trading profit amounted to £15,213, and after deducting all charges there is left a net profit of £7,311, which added to £4,655 brought forward, makes a total of £11,967. The directors propose dealing with this as follows:—Confirmed payment of dividend on the 6 per cent. cumulative participating preference shares for the year ended December 31st, less tax; pay a dividend of 7½ per cent. on the ordinary shares for the year, less tax, and carry forward £8,085.

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NEW COMPANIES REGISTERED.

H. LLEWELLYN DENT, LTD., Hadyn Park Works, Shepherd's Bush, W.—Capital £50,000, in £1 shares (30,000 pref.). Constructional, electrical, mechanical, engineers, etc., manufacturers of aerial requisites, etc. First directors:—F. Young, H. Llewellyn Dent. F. Young is the nominee of City of London Equipments, Ltd.

BUSINESS NAMES REGISTRATIONS.

DRAPIER ET CIE.—Registered January 3rd, 1917. Gauge makers, general mechanics for aeroplanes and otherwise, 21a Arthur Street, Plumstead, S.E. Partners:—M. Koppe (Belgian), 3, Macclesfield Street, Shaftesbury Avenue, W.C.; H. Drapier (Belgian), 25, Litchfield Street, Charing Cross Road, W.C.; Y. Brichaux (Belgian), 50, Charlotte Street, Tottenham Court Road, W.

J. H. ROBERTSON AND CO.—Registered December 28th, 1917. Metallurgical specialists and aeronautical engineers, 1, Albemarle Street, W. Proprietor, J. H. Robertson (British), 98, Queen's Road, Wimbledon.

If you require anything pertaining to aviation, study "FLIGHT'S" Buyers' Guide and Trade Directory, which appears in our advertisement pages each week (see pages lxxxii, lxxxiii and lxxxiv).

FLIGHT

and The Aircraft Engineer.

36, GREAT QUEEN STREET, KINGSWAY, W.C. 2.

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